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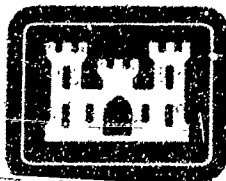
RECONNAISSANCE REPORT

SECTION 107

WEEKS BAY

BALDWIN COUNTY, ALABAMA

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**US Army Corps
of Engineers**
Mobile District

AUGUST 1990

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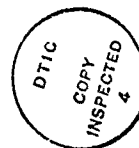
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RECONNAISSANCE REPORT

SECTION 107



WEEKS BAY

BALDWIN COUNTY, ALABAMA

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WEEKS BAY, ALABAMA
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SECTION 107 SMALL NAVIGATION PROJECT

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AUTHORITY AND BACKGROUND

This reconnaissance report is submitted under the authority contained in Section 107 of the River and Harbor Act of 1960 as amended. It is in response to a 26 December 1985 request by the County Commission of Baldwin County, Alabama for the Corps of Engineers to investigate the feasibility of "...dredging of the Channel from Fish River Bridge to that of the Big Mouth...". The channel would traverse Weeks Bay from North to South through "Big Mouth" into Bon Secour Bay. The County Commission supplemented their original request by letter dated 3 June 1986 asking the Corps of Engineers to also study the feasibility of providing navigation improvements into Magnolia River. The study was initiated by the Mobile District Planning Division in May 1986 as announced by Mobile District letter dated 22 May 1986. Pertinent correspondence is attached in Appendix A of this report.

PURPOSE AND SCOPE

The purpose of this report is to present the results of reconnaissance scope studies to determine the feasibility of the Federal Government and Baldwin County providing navigation improvements to Weeks Bay. Recommended navigation improvements in Weeks Bay must be cost shared between the Federal Government and Baldwin County in accordance with the provisions of the Water Resources Development Act of 1986 (Public Law 99-662).

DESCRIPTION OF STUDY AREA

Physical Setting. Weeks Bay, a small estuarine embayment comprised of open shallow waters and vegetated wetlands, is located on the eastern shore of Mobile Bay in southwest Baldwin County. It is geographically located between the two areas of Mobile, Alabama and Pensacola, Florida, and is easily accessible to these areas by U.S. Highway 98 (see Plate 1). Weeks Bay is elongated in shape being about 2.5 miles long from North to South and about 1.5 miles wide and covers an area of approximately 1700 acres. Fish River flows into the north end of the bay and Magnolia River flows into the east side of the bay. The south end of Weeks Bay narrows to about 300 feet at the inlet (Big Mouth) which connects it to Bon Secour Bay. An aerial photograph of the study area, taken in October 1986, is shown on Plate 2.

Socioeconomic Profile. In 1985, Baldwin County had a civilian labor force of 37,580 with total employment of 34,670 and unemployment of 2,910 or 7.7 percent. The county's economy is dominated by agriculture, with commercial fishing and tourism being strong in the coastal and southern portions. Available skilled labor and proximity to the Gulf of Mexico are very attractive to the commercial fishing and tourism industries and to their related industries, such as boat building and repair and seafood processing. Agriculture is most prevalent in the

interior portions of the county. Major crops include soybeans, corn, pecans and various other fruits and vegetables. Industrial development in Baldwin County includes light to medium manufacturing. Goods produced include dental equipment, furniture, ladies undergarments, mens trousers and nylon. According to The 1987 Economic Abstract of Alabama, Baldwin County had 120 manufacturing firms with a total employment of 4,300. The commercial fishing industry in Baldwin County is quite large, with most of the activity concentrated in the southern area of the county, and is primarily focused on the harvesting of shrimp, crabs and oysters. Data provided by Alabama Department of Conservation and Natural Resources shows that 407 commercial fishing vessel owners listed a Baldwin County address indicating that about 400 vessels are berthed in the county or nearby. Per capita income for Baldwin County in 1984 was \$10,331. Population statistics for the study area are shown below:

TABLE 1
POPULATION STATISTICS FOR STUDY AREA (1986)

<u>CITY/TOWN</u>	<u>POPULATION</u>
Fairhope	7,720
Foley	4,330
Daphne	3,830
Robertsdale	2,450
Gulf Shores	2,020
Loxley	860
Silverhill	620
Summerdale	610
Elberta	550
Totals for study area	22,990
Baldwin County	86,900
State of Alabama	2,387,400

Sources: Economic Abstract of Alabama, 1987
Alabama County Data Book, 1985
Alabama Municipal Data Book, 1985

General Physiography. Coastal Alabama lies within two major physiographical provinces: the East Gulf Coastal Plain section of the Coastal Plain province and Mississippi-Alabama shelf section of the Continental Shelf province. Land areas in coastal Alabama are within the Southern Pine Hills and the Coastal Lowlands subdivisions of the East Gulf Coastal Plain section. Alabama's Coastal Lowlands are essentially flat to gently undulating plains extending along the coast adjacent to the Mississippi Sound and the margins of Mobile, Bon Secour, and Perdido Bays. The lowlands are indented by many tidal creeks, rivers, and estuaries and are fringed by tidal marshes, all of which are subject to inundation at high tide. Weeks Bay is an

important estuary within Alabama's Coastal Lowlands.

Water and Land Use.

a. Water use. Weeks Bay has been closed to shrimping for several years, as it is an important nursing and staging area for shrimp, and is extremely important to the viability of the shrimp fishery in Bon Secour and Mobile Bays. Many of the other marine species which nurse in the estuary, including the spotted sea trout, red drum, croaker, flounder and mullet are also important commercial and sport species. Weeks Bay contains large stands of productive habitats that are critical to the life cycles of numerous aquatic and terrestrial animal species. As a nursery and staging area of Mobile Bay and the Gulf of Mexico, Weeks Bay is a microcosm of the entire Mobile Bay system in a more pristine state. Commercial fishing and larger recreational craft currently traverse with difficulty an existing channel through Weeks Bay to reach fishing grounds and recreation areas outside the Weeks Bay area. The Weeks Bay area provides recreational activities including boating, water-skiing, fishing and photography.

b. Land use. Land in the Weeks Bay area is largely undeveloped with some agricultural usage and small pockets of recreational usage along Fish River, Magnolia River and Weeks Bay. There are a number of substandard "camp" type structures along the bay and on the west bank of Fish River. Developed areas include the Magnolia Springs community situated on the north side of the Magnolia River approximately a mile and a half from the bay, the River Bluff subdivision, and the community of Marlow on Fish River just north of the bay. Along Weeks Bay there has been community development in the southeast and southwest areas and limited build-up of single family residential housing in these areas in close proximity to U.S. Highway 98 and Baldwin County Road No. 12.

Biological Characteristics.

a. Forested wetlands and swamp habitats. Much of the land around Weeks Bay is forested wetlands and swamps. The moist pine forest is prevalent in areas of low relief and poor drainage between streams. Moist pines form a more or less extensive strip between flood plain swamps and upland pine-oak forests. The vegetation of the moist pinelands is diverse and rich in species. The most common tree is the slash pine although longleaf pine may grow there. The understory may be very dense and consists largely of Galberry, wax myrtle, saw palmetto, St. John's worts, and occasional sweet bay, swamp bay and swamp tupelo. Fish River, Magnolia River and several small tidal streams in the Weeks Bay area are bordered by a forested wetland type known as bay, tupelo, cypress swamp. The vegetation of these swamps varies depending partly on the amount and duration of flooding.

If flooding is extensive, pond cypress and swamp tupelo may dominate the canopy. Usually under moderate flooding, the dominant trees are sweet bay. Red maple, swamp tupelo, swamp bay and tulip tree may also occur there. White cedar becomes increasingly more common in swamps along upper reaches of streams, especially along the Fish and Magnolia Rivers. Few plants grow under the dense shade of these trees. Among these are such shrubs as Virginia willow, star anis and fetterbush. Netted chain fern and cinnamon fern are among the few tolerant herbs growing there. The more open borders of these swampy woods may be covered by dense thickets of swamp cyrilla, black titi, and large gallberry. Wax myrtle and yaupon also grow in this habitat and are especially common along the brackish waters of Weeks Bay. The transition zone between these forested wetlands and upland pine-oak forests supports plants adapted to somewhat better drainage conditions such as water oak, laurel oak, sweetgum, southern magnolia and devilwood.

b. Marshes. The shoreline of Weeks Bay supports marshes dominated by salt tolerant emergent vegetation. These marshes occur as narrow shoreline fringes and extend up the tidal mouths of the Fish and Magnolia Rivers. The black needlerush is an abundant species and dominates portions of marsh in the area. Two species of cordgrass, salt grass and salt meadow, are locally abundant in the intertidal zone. Other frequent species are salt marsh aster, marsh gerardia and sea lavender. Within the less saline, brackish marshes a greater diversity of species occurs. Of the saline marsh species, only needlerush and saltmeadow cordgrass are found frequently in the brackish environment. Common brackish species include cattails, spike rush, reed, bull rush and swampgrass.

c. Submerged grassbeds. Four species of plants dominate the submerged grassbeds in Weeks Bay. The most abundant species is widgeon grass. The other species are Eurasian watermilfoil, tapegrass and slender pondweed. The occurrence of these grassbeds is restricted to relatively quiet waters along shorelines. Due to high turbidity conditions and subsequent reduction of available light, beds occur only in shallow waters less than two meters deep, primarily in 50 cm or less.

d. Animal populations. Because of the diversity of habitats found in the Weeks Bay system, a wide variety of animal species is present in the area. Many of these animals have special status because of threats to their habitat. According to the South Alabama Regional Planning Commission (1979), Weeks Bay is part of an area that provides habitat for as many as 19 threatened species. The fish populations in this area include freshwater species in the Fish and Magnolia Rivers and marine species in the lower portions of the rivers and bays. This area also serves as nursery grounds for numerous marine species. Many of the marine species such as spotted sea trout, red drum,

croaker, flounder, mullet and menhaden are important commercial species. The fish populations of this area also support a popular sport fishery. The Weeks Bay-Bon Secour Bay area is abundant with bird life having approximately 95 residents, plus 37 nesting, 125 wintering and 82 additional spring and fall migrants. This area is of special importance to the large number of trans-Gulf migrants as a resting and feeding area. The dominant migrants are from the Mississippi flyway, a generous number from the Atlantic flyway and some from the west. Holliman (1979) reported that there are 54 forms of mammals that live within the 10-foot contour in the coastal zone of Alabama, with most of these found in the Weeks Bay area. The freshwater and brackish swamp and marsh areas of Weeks Bay provide habitat for many species of amphibians and reptiles. The most prominent of these is the American alligator which is commonly reported in this area. Mount (1975) reported that there are 115 species of herpetofaunal forms in the Lower Coastal Plain of Alabama.

Cultural Resources.

a. Background. The lands surrounding Weeks Bay were extensively occupied throughout prehistoric times. Remains of the camps and villages of these early inhabitants are often seen eroding from the banks and beaches in the area. These sites are often found on lands elevated above and adjacent to the water's edge or bordering low swamps and marshes. No major archeological surveys have been conducted in this area, although several sites have been recorded through the efforts of local amateurs and work by the Alabama Museum of Natural History in the 1930's. Limited excavations were conducted at two previously recorded sites located at the mouth of Weeks Bay. These investigations revealed extensive deposits of shell, bone and artifacts dating from as early as 500 B.C. up to A.D. 1400. Reportedly, a Spanish coin dating to the early 16th century was found eroded on the beach below one of the sites.

b. Literature and records review. A review of the National Register of Historic Places indicates no sites or properties listed on, eligible for listing or being nominated to the Register within any lands in the study area. No previously recorded archeological sites are known for any of the lands under consideration. Scattered prehistoric artifacts are reportedly at a site within the study area. As stated above, no land within the study area has been surveyed for cultural resources. Historically, Weeks Bay has been used by small fishing craft and pleasure boats. Although the remains of these small craft can be expected in the areas considered for dredging, no reported shipwrecks are known within study area waters.

c. Findings. During the feasibility phase of this study, formal coordination will be initiated with the Alabama State Historic Preservation Officer. Current indications are that

archeological surveys would be required for all areas which would be used as upland disposal areas, but that underwater archeological surveys would not be warranted.

WEEKS BAY NATIONAL ESTUARINE SANCTUARY

Designation. In February 1986, Weeks Bay was designated a National Estuarine Sanctuary by the National Oceanic and Atmospheric Administration (NOAA) under the authority of Section 15 of the Coastal Zone Management Act of 1972 as amended, P.L. 92-583, 16 U.S.C. 1461, and in accordance with implementing regulations at 15 CFR 921.30. The State of Alabama has entered into a Memorandum of Understanding with NOAA concerning the establishment and administration of the Weeks Bay National Estuarine Sanctuary. The State of Alabama has designated the Alabama Department of Economic and Community Affairs to act on behalf of the State in matters concerning the Weeks Bay National Estuarine Sanctuary. The Gulf Shores office of the Marine Resource Division of the Alabama Department of Conservation has been designated by the State of Alabama with the responsibility for the day to day management of the sanctuary.

Goals and Objectives. The Weeks Bay National Estuarine Sanctuary has been established primarily for research and educational purposes. To the extent consistent with these principles, the sanctuary will also provide for long term resource protection and recreational activities. Principal research objectives include:

To gain a more thorough understanding of ecological relationships within the estuarine environment;

To make baseline ecological measurements; and

To serve as a natural control in order to monitor changes and assess the impacts of human stresses on the ecosystem.

Since the Weeks Bay area represents a microcosm of the entire Mobile Bay system, its establishment provides research opportunities that will increase knowledge of the Mobile Bay system. The educational objective is:

A means for increasing public knowledge and awareness of the complex nature of the estuarine ecosystems, their values and benefits to man and nature, and the problems confronting them.

The Weeks Bay area is well suited for educational programs because the area contains a variety of fauna, flora and estuarine habitat representative of the Mobile Bay system. It is convenient to Faulkner Junior College as well as the Baldwin County's primary and secondary schools. The recreation objective for the Weeks Bay estuarine area is:

The multiple use of the estuarine sanctuary to the extent that such use is compatible with the primary sanctuary purposes of research and education.

While a major objective of the Weeks Bay sanctuary is to provide long term resource protection so that selected sites may be used for scientific and educational purposes, other existing water and related land use activities such as fishing, hunting, boating, and wildlife observation will be allowed to continue, subject to current State and Federal laws and regulations.

Management. The National Oceanic and Atmospheric Administration provides consultation and performance evaluation for the Weeks Bay National Estuarine Sanctuary. The Alabama Department of Economic and Community Affairs has been designated with the responsibility for oversight and performance monitoring of the sanctuary. The Alabama Department of Conservation and Natural Resources with office in Gulf Shores Alabama is responsible for the on site and day to day management of the sanctuary. The State of Alabama has purchased and manages as part of the Weeks Bay sanctuary several tracts of land bordering on Weeks Bay.

PLAN FORMULATION

Economic Analysis. The existing commercial and recreation vessel fleets within Weeks Bay are not able to enter and exit their home ports on Fish and Magnolia Rivers without experiencing delays and damages because of inadequate channel depths through Weeks Bay. Based on analysis of historical data for the Weeks Bay hydrologic system, it was assumed that the Bay had reached a stable condition and that further shoaling of the channel through Weeks was unlikely. Field data were obtained documenting the existing vessel fleets and their operating costs. Using these data, it was possible to compute annual costs for delays experienced by commercial shrimpers, for damages to the commercial and recreational fleet and for lost recreation opportunity. Using the economic principle that avoidance of the costs experienced in the without project condition over the project life would be the economic benefits attributable to channel improvements, an analysis was made of the benefits attributable to channels with depths of 3, 4, 5 and 6 feet below Mean Low Water (MLW). The detailed economic analysis is attached to this report as Appendix B. These data will be used later to compute project justification and to optimize channel depths. Summarized below are data on the size and number of vessels in the permanent vessel fleets that use Weeks Bay and which are located on Fish and Magnolia Rivers:

TABLE 2
PERMANENT COMMERCIAL VESSEL FLEET

SIZE length, width, draft (ft)	FISH RIVER	MAGNOLIA RIVER
LARGE (35-45, 13, 4.5-5)	25	0
MEDIUM (25-35, 10, 3.1-4.4)	31	6
SMALL (20-25, 8, under 3)	19	6

TABLE 3
PERMANENT RECREATION FLEET

SIZE length, width, draft (ft)	FISH RIVER	MAGNOLIA RIVER
LARGE MOTOR YACHTS (30-50, 14, 4.5-5)	30	10
MEDIUM POWER BOATS (20-30, 10, 3.1-4.4)	40	30
SMALL POWER BOATS (15-20, 7, UNDER 3)	35	10

The estimated annual benefits for providing a navigation channel with depths of 3, 4, 5 and 6 feet below (MLW) are summarized for both the Fish and Magnolia Rivers:

TABLE 4
SUMMARY OF ANNUAL ECONOMIC BENEFITS

BENEFIT CATEGORY	3FT	<u>FISH RIVER</u>		
		4FT	5FT	6FT
DAMAGE REDUCTION				
COMMERCIAL	\$0	\$4,900	\$16,800	\$36,600
RECREATION	\$0	\$0	\$0	\$0
DELAY COST REDUCTION				
COMMERCIAL	\$82,000	\$203,400	\$213,800	\$215,500
RECREATION	<u>\$4,700</u>	<u>\$9,800</u>	<u>\$10,900</u>	<u>\$11,000</u>
TOTAL BENEFITS	\$86,700	\$218,100	\$241,500	\$263,100

	3FT	<u>MAGNOLIA RIVER</u>		
		4FT	5FT	6FT
DAMAGE REDUCTION				
COMMERCIAL	\$0	\$1,600	\$3,900	\$3,900
RECREATION	\$0	\$0	\$0	\$0
DELAY COST REDUCTION				
COMMERCIAL	\$9,900	\$12,400	\$12,600	\$12,600
RECREATION	<u>\$2,900</u>	<u>\$5,000</u>	<u>\$5,400</u>	<u>\$5,400</u>
TOTAL BENEFITS	\$12,800	\$19,000	\$21,900	\$21,900

Channel Design. Channel alignment was selected in order to maximize use of the existing channel in Weeks Bay. See Plate 3 for the channel alignment and reaches selected for design and analysis. Four alternative channels were designed to accommodate vessels listed above. Channel designs were based on guidance in EM 1110-2-1615, Hydraulic Design of Small Boat Harbors, dated 25 Sep 84. Weeks Bay is an environmentally sensitive area, and design considerations and assumptions reflect efforts to minimize adverse impacts of any channel excavation. Channel widths for each alternative were based on an assumption of one-way traffic. The design velocity assumed for bend widening is 4 knots, less than the normal maximum speed of commercial shrimping vessels in open water. Because most of the channel designed lies in protected waters, wind and wave forces were assumed to be negligible. Bend widening was computed at each bend using both the Cut-off Method and the Beam Width Method, and the method providing the more conservative answer was used for bend widening. Controllability was assumed to be good and no strong yawing forces were assumed. One foot of advance maintenance and one foot of allowable overdepth were assumed for initial dredging and the quantity estimates for all alternatives reflect these assumptions.

a. Alternative 1. Alternative 1 was designed to accommodate an 8 ft. wide by 25 foot long vessel with a draft of 1.5 ft. The channel will be 40 feet wide with side slopes of 1 vertical to 5 horizontal. The bottom elevation of the channel was set at elevation -3.0 Mean Low Water (MLW). This elevation provides a safety clearance of 1.0 ft. and provision of 0.5 ft. of squat. The bottom width required for the design vessel is actually less than 40 ft., however, 40 ft. is the minimum required for a small swing dredge with capability on the order of the size required.

b. Alternative 2. Alternative 2 was designed to accommodate a vessel 10 ft. wide by 35 ft. long with a loaded draft of 2 ft. This alternative consists of a channel 40 ft. wide with side slopes of 1 vertical to 5 horizontal. The bottom elevation of this channel was set at -4.0 ft. MLW. This elevation provides a safety clearance of 1.0 ft. and provision of 1.0 ft. of squat. The channel width was dictated by the minimum width required for a small swing dredge.

c. Alternative 3. Alternative 3 was designed to accommodate a vessel 14 ft. wide by 50 ft. long with a loaded draft of 3 ft. This alternative consists of a channel 45 ft. wide with side slopes of 1 vertical to 5 horizontal. The bottom elevation of this channel was set at -5.0 ft. MLW. This elevation provides a safety clearance of 1.0 ft. and provision of 1.0 ft. of squat.

d. Alternative 4. Alternative 4 was designed to accommodate a vessel 14 ft. wide by 50 ft. long with a loaded draft of 4 ft. This alternative consists of a channel 45 ft. wide with side slopes of 1 vertical to 5 horizontal. The bottom elevation of this channel was set at - 0 ft. MLW. This elevation provides a safety clearance 1.0 ft. and provision of 1.0 ft. of squat.

The required initial excavation (by reach as shown on Plate 3) including advance maintenance of 1 ft. and allowable overdepth of 1 ft. for the four alternative channels is shown in the following table:

TABLE 5
INITIAL DREDGING QUANTITIES (CY)

CHANNEL DIMENSIONS	WEEKS BAY	FISH RIVER	MAGNOLIA RIVER
3 X 40	15,469	20,119	12,680
4 X 40	27,935	33,508	21,471
5 X 45	54,368	54,507	35,460
6 X 45	87,647	73,596	47,286

Maintenance dredging quantities were computed using the Bon Secour channel as a prototype. Condition surveys of the Bon Secour channel made in 1982 and 1987 indicate that the original 10 ft. by 80 ft. channel had shoaled at a rate of approximately 3 cubic yards per foot of channel length per year. The assumption was made that shoaling rates in the Weeks Bay channel were directly related to those in the Bon Secour channel. Computation of shoaling rates for the four alternative channel designs is shown below:

TABLE 6
COMPUTATION OF SHOALING RATE

CHANNEL	SIZE (FT)	AREA (SQ FT)	PERCENT OF BON SECOUR CHANNEL AREA	SHOALING RATE (CY/FT/YR)
Bon Secour	10x80	1300	100	3.00
Weeks Bay	3x40	165	13	0.39
Weeks Bay	4x40	240	18	0.54
Weeks Bay	5x45	350	27	0.81
Weeks Bay	6x45	420	32	1.04

Shoaling rates are assumed to be effective only over the length of channel where the initial dredging would be significant. These lengths were determined and multiplied by the shoaling rates to obtain an annual shoaling volume for each alternative. Shoaling quantities are given below for each segment.

TABLE 7
MAINTENANCE DREDGING QUANTITIES (CY)

CHANNEL DIMENSIONS	WEEKS BAY	FISH RIVER	MAGNOLIA RIVER
3 X 40	1,423	2,125	1,131
4 X 40	1,971	2,943	1,566
5 X 45	3,807	4,947	2,916
6 X 45	13,520	7,072	4,316

Dredging Cost Computations. Estimates of dredging costs were based on the use of a 12" hydraulic dredge, with the placement of material into three upland placement areas, all located above the 6 meter contour. Open water disposal in Weeks Bay and Mobile Bay was not considered for environmental reasons. Transport of the dredged material to the Gulf of Mexico for open water disposal was ruled out because this alternative was too costly. For this reconnaissance study, actual dredged material placement sites were not located. However, potential sites that would be environmentally acceptable were located in the vicinity of the proposed channels and used to develop the dredging costs. No wetlands were considered for disposal sites. Upland disposal of the dredged material from the proposed channels through Weeks Bay was considered to be a potentially implementable plan. More details are given in Appendix C, Dredging Cost Computations.

Cost-Benefit Analysis.

a. Magnolia River Reach. The project was divided into reaches for the purpose of evaluation of costs and benefits. See Plate 3. This was necessary for the economic evaluation. Since Magnolia River had small benefits, it was decided to evaluate the economic feasibility of this reach as if the Fish River-Weeks Bay reach were constructed and in place and the Magnolia reach was a separate project connecting to the Fish River-Weeks Bay reach. This would keep the costs to the Magnolia River reach to a minimum, and if the project were not feasible under this favorable scenario, then it would be dropped from further consideration. The first step then was to compute the costs of constructing the reach of channel into Magnolia River. Table 8 contains new work dredging costs:

TABLE 8
NEW WORK DREDGING COSTS - MAGNOLIA RIVER

CHANNEL DEPTH	3' (1'AD MA)	4' (1'AD MA)	5' (1'AD MA)	6' (1'AD MA)
DREDGING COST	\$133,000	\$213,000	\$340,000	\$448,000
MOB/DEMOB	\$12,500	\$13,100	\$12,300	\$11,300
CLEARING/GRUBBING	\$19,400	\$25,000	\$38,600	\$64,200
DIKING COSTS	\$78,900	\$84,900	\$114,000	\$137,500
SUBTOTAL	\$243,800	\$336,000	\$504,900	\$661,000
CONTINGENCIES (15%)	\$36,600	\$50,400	\$75,700	\$99,200
SUBTOTAL	\$280,400	\$386,400	\$580,600	\$760,200
E & D (6%)	\$16,800	\$23,200	\$34,800	\$45,600
S & A (6%)	\$16,800	\$23,200	\$34,800	\$45,600
SUBTOTAL	\$314,000	\$432,800	\$650,200	\$851,400
DISPOSAL AREA LAND	\$44,800	\$57,700	\$126,200	\$148,400
TOTAL FIRST COST	\$358,800	\$490,500	\$776,400	\$999,800
AVG ANN COST	\$32,300	\$44,200	\$69,900	\$90,000

Table 9 contains maintenance dredging costs for the four channel depths considered.

TABLE 9
MAINTENANCE DREDGING COSTS - MAGNOLIA RIVER

CHANNEL DEPTH	3' (1'AD MA)	4' (1'AD MA)	5' (1'AD MA)	6' (1'AD MA)
DREDGING	\$132,000	\$132,000	\$160,000	\$182,000
MOB/DEMOB	\$12,400	\$12,400	\$12,800	\$8,800
SUBTOTAL	\$144,400	\$144,400	\$172,800	\$190,800
CONTINGENCIES (15%)	\$21,700	\$21,700	\$25,900	\$28,600
SUBTOTAL	\$166,100	\$166,100	\$198,700	\$219,400
E & D (6%)	\$10,000	\$10,000	\$11,900	\$13,200
S & A (6%)	\$10,000	\$10,000	\$11,900	\$13,200
TOTAL COST	\$186,100	\$186,100	\$222,500	\$245,800
DREDGING FREQUENCY	4	3	2	2

Initial dike construction for the dredged material placement area is contained in Table 8 under new work costs. Two further dike raisings will be required, an interim and an ultimate dike raising as shown in Tables 10 and 11:

TABLE 10
DIKE RAISING COSTS - MAGNOLIA RIVER

CHANNEL DEPTH	3' (1'AD MA)	4' (1'AD MA)	5' (1'AD MA)	6' (1'AD MA)
INTERIM DIKE	\$132,500	\$159,900	\$214,800	\$259,100
CONTINGENCIES 15%	\$19,900	\$24,000	\$32,200	\$38,900
SUBTOTAL	\$152,400	\$183,900	\$247,000	\$298,000
E & D (6%)	\$9,100	\$11,000	\$14,800	\$17,900
S & A (6%)	\$9,100	\$11,000	\$14,800	\$17,900
TOTAL	\$170,600	\$205,900	\$276,600	\$333,800
YEAR NEEDED	12	9	12	12

TABLE 11
DIKE RAISING COSTS - MAGNOLIA RIVER

CHANNEL DEPTH	3' (1'AD MA)	4' (1'AD MA)	5' (1'AD MA)	6' (1'AD MA)
ULTIMATE DIKE	\$170,900	\$206,300	\$277,200	\$334,400
CONTINGENCIES 15%	\$25,600	\$30,900	\$41,600	\$50,200
SUBTOTAL	\$196,500	\$237,200	\$318,800	\$384,600
E & D (6%)	\$11,800	\$14,200	\$19,100	\$23,100
S & A (6%)	\$11,800	\$14,200	\$19,100	\$23,100
TOTAL	\$220,100	\$265,600	\$357,000	\$430,800
YEAR NEEDED	32	30	32	32

The last step in the benefit-cost analysis for the Magnolia River reach of the Weeks Bay channels was to compute the annual charges based on an 8 and 7/8 percent interest rate. The benefit-cost computations for the four proposed channels from Weeks Bay into Magnolia River are shown in Table 12 below:

TABLE 12
COMPUTATION OF BENEFIT-COST RATIO
MAGNOLIA RIVER

CHANNEL DEPTH	3' (1'AD MA)	4' (1'AD MA)	5' (1'AD MA)	6' (1'AD MA)
ANNUAL CHARGES				
NEW WORK DREDGING	\$32,300	\$44,200	\$69,900	\$90,000
MAINT DREDGING	\$40,700	\$56,700	\$106,500	\$117,700
DIKE MAINTENANCE	\$6,800	\$10,500	\$11,100	\$13,400
TOTAL ANN CHARGE	\$79,800	\$111,400	\$187,500	\$221,100
AV ANN BENEFITS	\$12,800	\$19,000	\$21,900	\$21,900
BEN/COST RATIO	0.16	0.17	0.12	0.1

As can be seen by the computations in Table 12, a deeper channel into Magnolia River is not economically justified.

b. Fish River-Weeks Bay Reach. The next step in the analysis was to compute the costs and the benefits for the Fish River-Weeks Bay reach. Table 13 contains the new work dredging costs for this reach:

TABLE 13
NEW WORK DREDGING COSTS - FISH RIVER

CHANNEL DEPTH	3' (1'AD MA)	4' (1'AD MA)	5' (1'AD MA)	6' (1'AD MA)
DREDGING COST	\$430,000	\$650,000	\$1,126,000	\$1,654,000
MOB/DEMOB	\$53,000	\$53,000	\$53,000	\$53,000
CLEARING/GRUBBING	\$52,400	\$68,300	\$105,800	\$130,100
DIKING COSTS	\$174,500	\$209,500	\$279,900	\$409,400
SUBTOTAL	\$709,900	\$980,800	\$1,564,700	\$2,246,500
CONTINGENCIES (15%)	\$106,500	\$147,100	\$234,700	\$337,000
SUBTOTAL	\$816,400	\$1,127,900	\$1,799,400	\$2,583,500
E & D (6%)	\$49,000	\$67,700	\$108,000	\$155,000
S & A (6%)	\$49,000	\$67,700	\$108,000	\$155,000
SUBTOTAL	\$914,400	\$1,263,300	\$2,015,400	\$2,893,500
LAND-DISPOSAL AREA	\$121,000	\$158,000	\$244,600	\$454,700
TOTAL FIRST COST	\$1,035,400	\$1,421,300	\$2,260,000	\$3,348,200
AVG ANN COST	\$93,200	\$128,000	\$203,500	\$301,400

Table 14 contains the computation of the maintenance dredging costs for the Fish River-Weeks Bay reach.

TABLE 14
MAINTENANCE DREDGING COSTS - FISH RIVER

CHANNEL DEPTH	3' (1'AD MA)	4' (1'AD MA)	5' (1'AD MA)	6' (1'AD MA)
DREDGING	\$430,000	\$430,000	\$504,000	\$910,000
MOB/DEMOB	\$53,000	\$53,000	\$53,000	\$53,000
SUBTOTAL	\$483,000	\$483,000	\$557,000	\$963,000
CONTINGENCIES (15%)	\$72,500	\$72,500	\$83,600	\$144,500
SUBTOTAL	\$555,500	\$555,500	\$640,600	\$1,107,500
E & D (6%)	\$33,300	\$33,300	\$38,400	\$66,500
S & A (6%)	\$33,300	\$33,300	\$38,400	\$66,500
TOTAL COST	\$622,100	\$622,100	\$717,400	\$1,240,500
DREDGING FREQUENCY	4	3	2	2

The initial diking costs are contained in Table 13, New Work Dredging Costs. Tables 15 and 16 contain the dike raising costs for the interim and the ultimate dikes.

TABLE 15
DIKE RAISING COSTS - FISH RIVER

CHANNEL DEPTH	3' (1'AD MA)	4' (1'AD MA)	5' (1'AD MA)	6' (1'AD MA)
INTERIM DIKE	\$328,900	\$394,900	\$527,700	\$721,800
CONTINGENCIES 15%	\$59,200	\$79,200	\$108,300	\$108,300
SUBTOTAL	\$388,100	\$474,100	\$636,000	\$830,100
E & D (6%)	\$23,300	\$28,400	\$38,200	\$49,800
S & A (6%)	\$23,300	\$28,400	\$38,200	\$49,800
TOTAL	\$434,700	\$530,900	\$712,400	\$929,700
YEAR NEEDED	12	9	12	12

TABLE 16
DIKE RAISING COSTS - FISH RIVER

CHANNEL DEPTH	3' (1'AD MA)	4' (1'AD MA)	5' (1'AD MA)	6' (1'AD MA)
ULTIMATE DIKE	\$424,300	\$509,600	\$680,900	\$995,800
CONTINGENCIES 15%	\$63,600	\$76,400	\$102,100	\$149,400
SUBTOTAL	\$487,900	\$586,000	\$783,000	\$1,145,200
E & D (6%)	\$29,300	\$35,200	\$47,000	\$68,700
S & A (6%)	\$29,300	\$35,200	\$47,000	\$68,700
TOTAL	\$546,500	\$656,400	\$877,000	\$1,282,600
YEAR NEEDED	32	30	32	32

The last step in the economic analysis of the Fish River-Weeks Bay reach was to compute annual charges at 8 and 7/8 percent interest and compare them to annual benefits. Table 17 contains this computation

TABLE 17
COMPUTATION OF BENEFIT-COST RATIO
FISH RIVER

CHANNEL DEPTH	3' (1'AD MA)	4' (1'AD MA)	5' (1'AD MA)	6' (1'AD MA)
ANNUAL CHARGES				
NEW WORK DREDGING	\$93,200	\$128,000	\$203,500	\$301,400
MAINT DREDGING	\$135,900	\$189,500	\$343,500	\$593,900
DIKE MAINTENANCE	\$17,300	\$26,800	\$28,300	\$37,800
NAVIGATION AIDS				
INSTALLATION	\$900	\$900	\$900	\$900
MAINTENANCE	\$1,100	\$1,100	\$1,100	\$1,100
TOTAL ANN CHARGE	\$248,400	\$346,300	\$577,300	\$935,100
AV ANN BENEFITS	\$86,700	\$218,100	\$241,500	\$263,100
BEN/COST RATIO	0.3	0.6	0.4	0.3

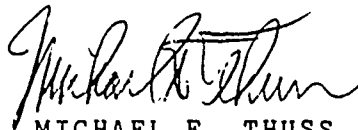
The resulting computation revealed that none of the channel depths through Weeks Bay into Fish River were economically justified.

CONCLUSIONS

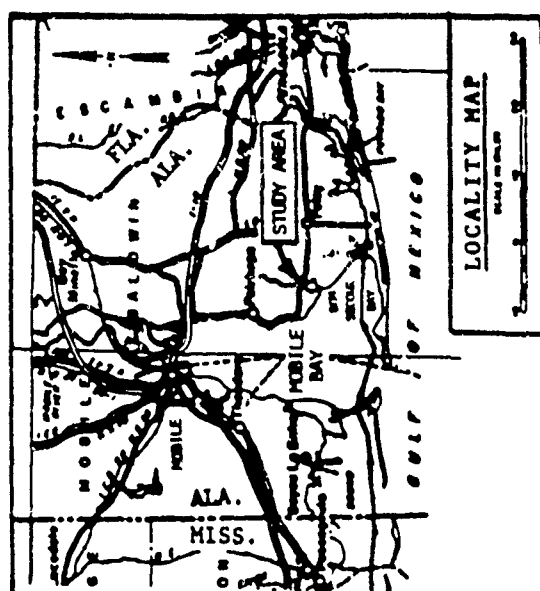
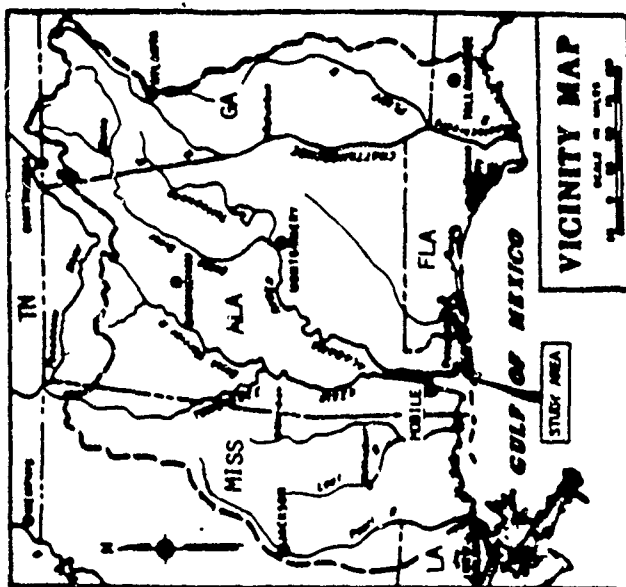
Deepening of the channel from Big Mouth through Weeks Bay into Fish and Magnolia Rivers is not economically justified at this time. Further study of channel improvements in Weeks Bay is not warranted.

RECOMMENDATION

It is recommended that the Section 107 study of navigation improvements in Weeks Bay be terminated.

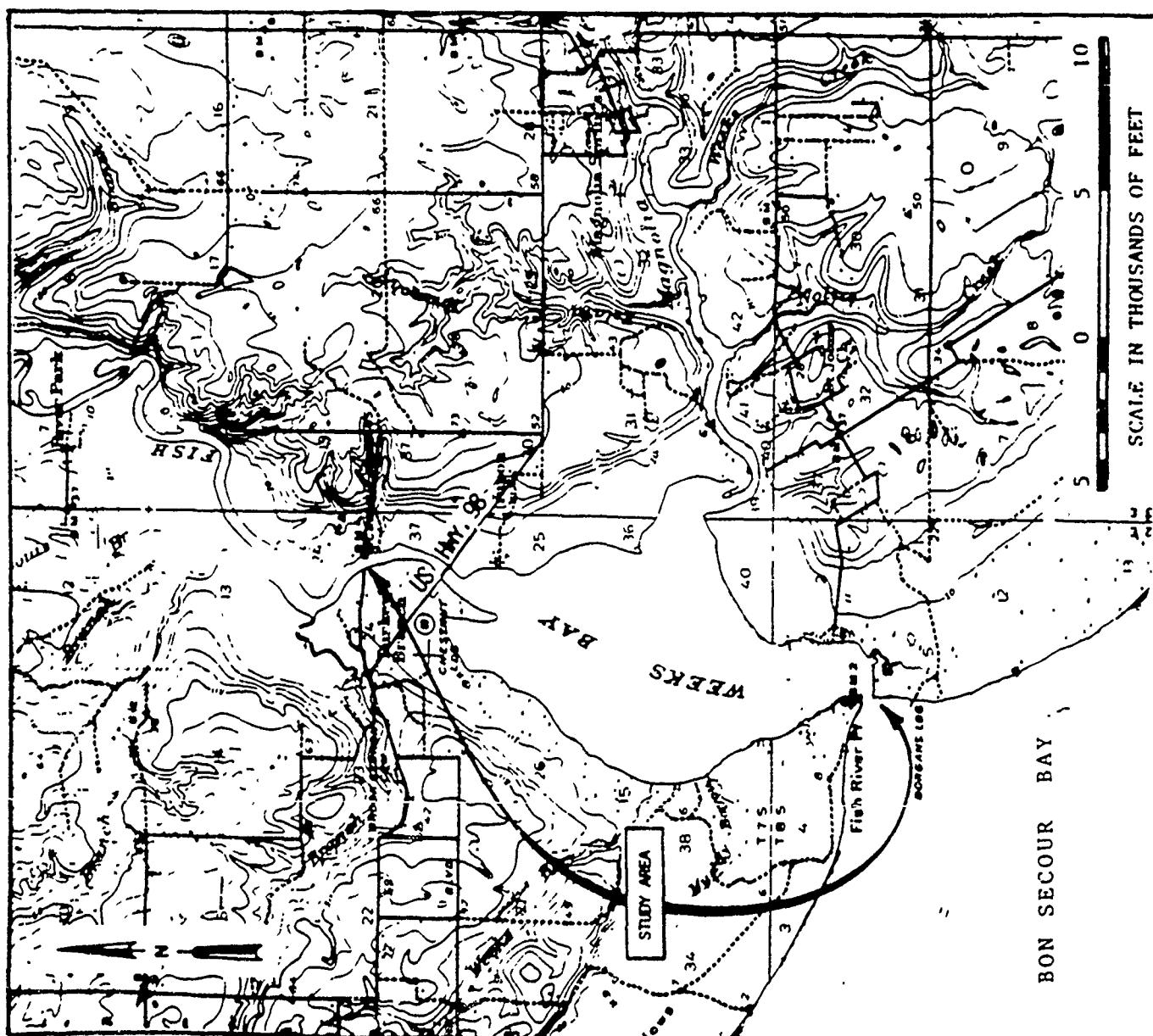
A handwritten signature in dark ink, appearing to read "Michael F. Thuss", with a stylized, cursive script.

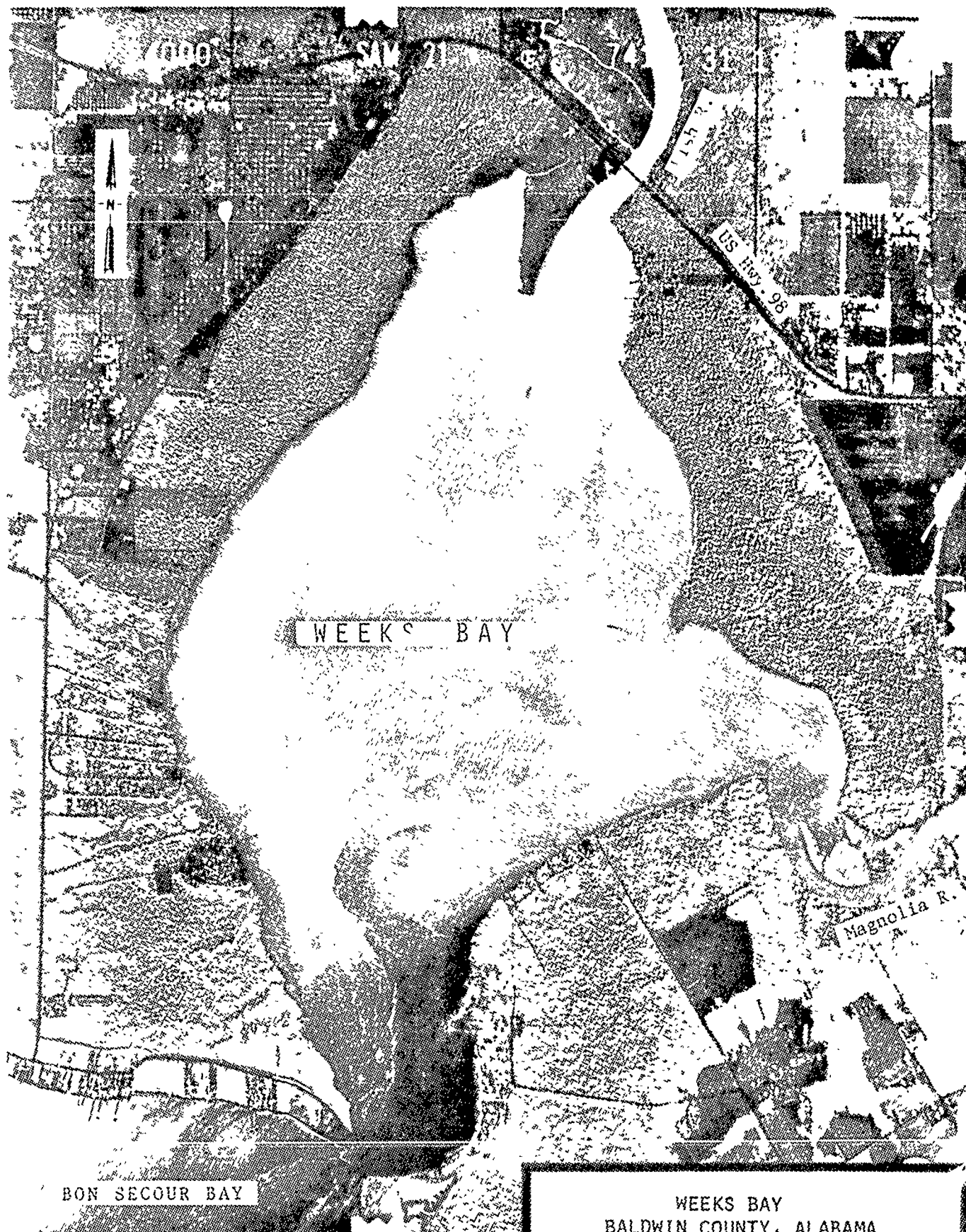
MICHAEL F. THUSS
Colonel, Corps of Engineers
District Engineer



WEEKS BAY, ALABAMA
SECTION 107, NAVIGATION STUDY
BALDWIN COUNTY, ALABAMA

STUDY AREA





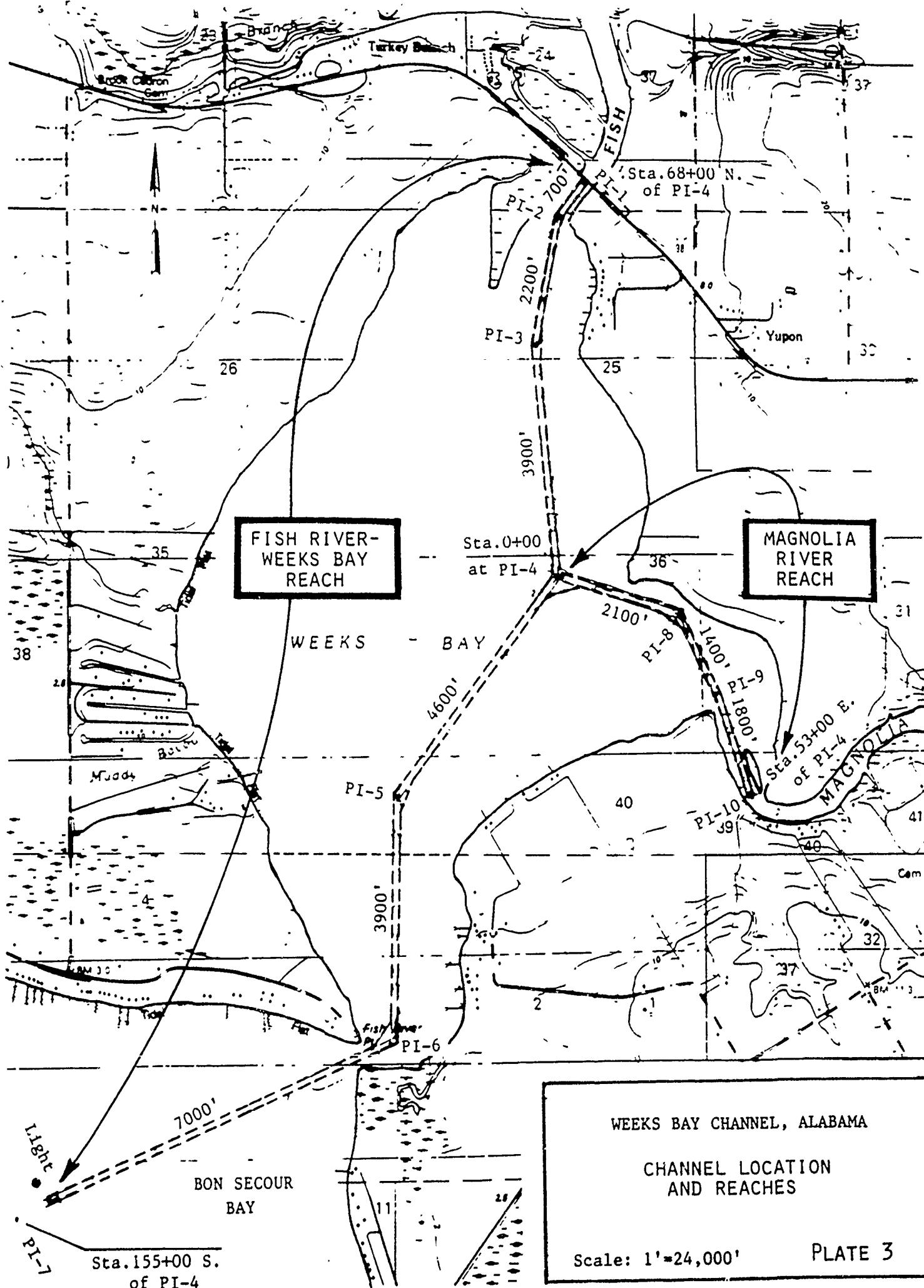
BON SECOUR BAY

Note:
Aerial photograph taken October 1986.
Scale: 1" = 2000'

WEEKS BAY
BALDWIN COUNTY, ALABAMA

AERIAL PHOTOGRAPH
OF STUDY AREA

PLATE 2



APPENDIX A

PERTINENT CORRESPONDENCE



COUNTY COMMISSION
BALDWIN COUNTY
P. O. BOX 148
BAY MINETTE, ALA.
36507
(205) 937-9561

MEMBERS
CLARENCE H. BISHOP
NEIL LAUDER
ALTON WHITE
RICHARD M. JENKINS
ADMINISTRATOR
DAVID C. WOOD

December 26, 1985

U.S. Army Corp of Engineers
Colonel C. Hilton Dunn, Jr.
District Engineer
P.O. Box 2288
Mobile, AL 36628

RE: Feasibility Study

Dear Col. Dunn:

The Baldwin County Commission during their regularly held meeting of December 17, 1985, unanimously agreed to authorize me to write you and request a Feasibility Study be conducted upon the dredging of the Channel from Fish River Bridge to that of the Big Mouth as the commercial and pleasure boating is limited now and can only move in and out of this channel during high tide.

Please report your findings back to me as soon as possible so that I may report to the Baldwin County Commission.

If you have any questions, please feel free to give me a call.

Sincerely,

Clarence Bishop
Clarence Bishop
Chairman

CB/lgr

February 6, 1986

Coastal Branch

Mr. Richard M. Jenkins, Chairman
Baldwin County Commission
Post Office Box 148
Bay Minette, Alabama 36507

Dear Mr. Jenkins:

This is in reply to the Commission's letter of December 26, 1985, requesting assistance with a problem of shallow depths in the Fish River channel. Mr. Bob Martin, an engineer with the Mobile District, has visited the area and has talked by telephone with Commissioner Clarence Bishop and others concerning the problem. On the basis of this preliminary investigation, I will undertake an Initial Appraisal as authorized by Section 107 of the 1960 River and Harbor Act, as amended, as soon as our workload permits. We expect that to be some time in the summer, but I will let you know if we can begin earlier.

Our Initial Appraisal will indicate whether a feasible project can be developed. If the results are favorable, we will request funds to undertake a Reconnaissance investigation. Detailed Project Studies beyond the Reconnaissance phase, however, would require cost sharing on a 50-50 basis by the local study sponsor in accordance with the current policy of the Assistant Secretary of the Army (Civil Works).

I will inform you of our proposed schedule for the Initial Appraisal. If you have any questions in the interim, please feel free to call Mr. Martin at 694-3805.

Sincerely,

C. Hilton Dunn, Jr.
Colonel, CE
District Engineer



DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF

May 22, 1986

Coastal Branch

Mr. Richard M. Jenkins, Chairman
County Commission of Baldwin County
Post Office Box 148
Bay Minette, Alabama 36507

Dear Mr. Jenkins:

By letter dated December 26, 1985, the Commission requested a Feasibility Study for dredging Fish River from Fish River bridge to Big Mouth. An investigation of this problem appears to be justified and could be initiated under the authority of Section 107, River and Harbor Act of 1960, as amended. In response to your request, we are initiating an Initial Appraisal study of the navigation problems at Fish River. Someone from this office will be in contact with you in the near future in connection with this investigation.

During the next several months we will investigate the problems at Fish River and determine if further, more detailed, studies are warranted. If the Initial Appraisal study results in a determination that further studies are advisable we will proceed to a Reconnaissance Study, and then to a Feasibility Study. During the reconnaissance phase, Baldwin County, as the potential local sponsor, will be asked to enter into an agreement with the Federal Government to share in the cost of the Feasibility Study.

Should you have any questions, feel free to call me or to directly contact the Study Manager, Mr. Walter W. Burdin at 690-2772.

Sincerely,

Lawrence R. Green
Chief, Planning Division



COUNTY COMMISSION
BALDWIN COUNTY
P. O. BOX 148
BAY MINETTE, ALA.
36507
(205) 937-8561

MEMBERS

CLARENCE H BISHOP
NEIL LAUDER
ALTON WHITE
RICHARD M JENKINS
ADMINISTRATOR
DAVID C WOOD

June 3, 1986

Mr. Roger A. Burke
Department of the Army
Mobile District, Corps of Engineers
P.O. Box 2288
Mobile, AL 36628-0001

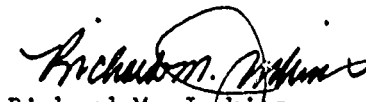
RE: Magnolia River, Dredging Project

Dear Mr. Burke:

The Baldwin County Commission during their regularly held meeting of June 3, 1986, unanimously agreed to request the Corp of Engineers during their feasibility study for the dredging of the channel from Fish River to that of Big Mouth across Weeks Bay to include as a joint project, the Magnolia River Channel.

If you could investigate this and report your findings, I would be most appreciative.

Sincerely,


Richard M. Jenkins
Chairman

RMJ/lgr

June 30, 1986

Coastal Branch

Mr. Richard M. Jenkins, Chairman
County Commission of Baldwin County
Post Office Box 948
Bay Minette, Alabama 36507

Dear Mr. Jenkins:

In response to your letter dated June 3, 1986, in which the Commission requested that Magnolia River be included in the Feasibility Study for dredging Fish River, we have taken the necessary action to make that change. Someone from this office will be in contact with you in the near future in connection with this investigation, which is now in progress.

Should you have any questions, feel free to call me or to directly contact the Study Manager, Mr. Walter W. Burdin at 690-2772.

Sincerely,

Lawrence R. Green
Chief, Planning Division

June 15, 1990

Plan Development Section

Mr. James J. Boyington
County Administrator
Baldwin County Commission
P. O. Box 143
Bay Minette, AL 36507

Dear Mr. Boyington:

In December 1985, the County Commission of Baldwin County requested that the Corps of Engineers investigate the feasibility of deepening the channel from the Fish River bridge through Weeks Bay to Big Mouth. This was supplemented in June of 1986 with a request to include deepening of the channel into Magnolia River.

Reconnaissance level studies have been completed. Our preliminary recommendation is to terminate the study for lack of economic justification. The maximum benefit cost ratio for the Magnolia River reach was 0.17 to 1 for a four foot channel, which is far short of the required minimum benefit cost ratio of 1.0 to 1. The Fish River reach had a maximum benefit cost ratio of 0.6 to 1 for a four foot channel which is also far short of the required 1.0 to 1 benefit cost ratio. If Baldwin County can furnish any additional information which may change the economic analysis contained in the report, we would be glad to consider that information.

Our analysis stopped at this point since, without economic justification, it would have been pointless to prepare an environmental analysis. If information were furnished by Baldwin County that would make channel deepening for navigation economically justified, two further conditions would have to be met before the project could be further considered. First, an environmental evaluation would have to be made after preliminary coordination with the environmental agencies. As you are aware, Weeks Bay has been designated a National Estuarine Sanctuary and the State of Alabama and the National Oceanic and Atmospheric Administration are currently purchasing land contiguous

to Weeks Bay as part of the sanctuary program. This could have some influence on the environmental evaluation. Secondly, Baldwin County would have to cost share in the feasibility study on a 50-50 basis (current estimate of the feasibility studies are approximately \$200,000) and also furnish assurance to cost share in the construction if a project were recommended. The most significant part of cost sharing for construction would be provision of upland disposal areas currently estimated to be in excess of 100 acres.

The above information is furnished to give you a realistic idea of what it would take to make construction of deeper navigation channels in Weeks Bay a reality. If you can provide information which would increase the economic benefits and would make deeper channels in Weeks Bay economically justified, we will pursue the study further and perform the environmental evaluation. If, however, you agree with our conclusion to terminate the study, we request that you furnish us a letter to that effect. If you have any questions about the contents of this letter or about the draft report, please feel free to call Milton Rider, Study Manager, at 694-3831.

Sincerely,

N. D. McClure IV
Chief, Planning Division

Enclosure

Copy Furnished:

Mr. Harry Moreland
Director of Economic Development
Baldwin County
1100 Fairhope Ave.
Fairhope, Alabama 36532



COUNTY COMMISSION
BALDWIN COUNTY
P O. BOX 1488
BAY MINETTE, ALA.
36507
(205) 937-9561

MEMBERS
DIST 1 SAMUEL JENKINS
2 FRANK BURT, JR
3 MICHAEL ALLEGRI
4 MAX FOREMAN
5 CECIL M WARD
6 WENDY ALLEN
7 BORDEN MORROW

ADMINISTRATOR
JERRY BOYINGTON

CLERK/TREASURER
LOCKE W WILLIAMS

July 31, 1990

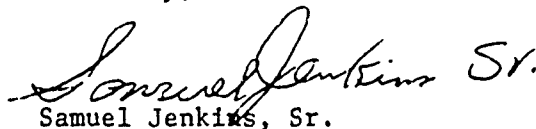
U. S. Army Corps of Engineers
Mobile District
Post Office Box 2288
Mobile, Alabama 36628

Sirs,

In reference to the Section 107 Reconnaissance Reports on Weeks Bay and Palmetto and Soldiers Creek in Baldwin County, Alabama, the Baldwin County Commission reports its acceptance of the findings of these reports at this time.

The County Commission appreciates the efforts and work of the Corps of Engineers in these two projects in the County. Thank you for a very comprehensive report.

Sincerely,


Samuel Jenkins, Sr.

SJ/jlr

APPENDIX B

ECONOMIC ANALYSIS

ECONOMIC ANALYSIS OF WEEKS BAY

INTRODUCTION

This report determines and evaluates the economic costs associated with proposed channel improvement of Weeks Bay. Benefits attributable to the various project alternatives are the reductions in vessel operating costs that accrue as result of the project.

- a. Socio-Economic Profile
- b. General
- c. Existing Condition Vessel Operations
- d. Methodology
- e. Without-Project Condition Vessel Operating Costs
- f. Alternatives Considered
- g. With Project Condition Benefits
- h. Summary
- i. Sensitivity Analysis

SOCIO-ECONOMIC PROFILE

Weeks Bay is located on the eastern shore of Mobile Bay in southwest Baldwin County, Alabama. It is situated roughly halfway between the metropolitan areas of Mobile, Alabama, and Pensacola, Florida. Mobile is approximately 31 miles to the northwest and Pensacola is 38 miles to the east. Both areas are easily accessible via U.S. Highway 98. The study area is shown on Figure 1.

In 1985, Baldwin County had a civilian labor force of 37,580 with total employment of 34,670 and unemployment of 2,910 or 7.7 percent. The county's economy is dominated by agriculture, with commercial fishing and tourism being strong in the coastal and southern portions. As a result, 17,570 of the 21,490 earning a wage or salary do so in nonmanufacturing jobs. Available skilled labor and proximity to the Gulf of Mexico are very attractive to the commercial fishing and tourism industries and to their related industries, such as boat building and repair and seafood processing. Agriculture is most prevalent in the interior portions of the county. Major crops include soybeans, corn, pecans and various other fruits and vegetables. The total market value of all agricultural products sold in 1982 was \$44,569,000. Industrial development in Baldwin County includes light to medium manufacturing. Goods produced include dental equipment, furniture, clothing and nylon². The commercial fishing industry in Baldwin County is quite large, with most of the activity concentrated in the southern area of the county, and is primarily focused on the harvesting of shrimp, crabs and oysters.

Data provided by Alabama Department of Conservation and Natural Resources shows that 407 commercial fishing vessel owners listed a Baldwin County address, indicating that roughly 400 such vessels are berthed in the county or nearby. According to The 1987 Economic Abstract of Alabama, Baldwin County had 120 manufacturing firms with a total employment of 4,300. Per capita income for Baldwin County in 1984 was \$10,331.00. Family median income in 1979 was \$19,426.00, also from The 1987 Economic Abstract of Alabama. Population statistics for the state, county and principal towns of the study area are found in table 1. (All tables are found in the appendix to this report.)

GENERAL

Weeks Bay is an elongated estuarine embayment approximately 2.5 miles long from north to south, and 1.5 miles wide at its widest point. Fish River flows into this bay from the north, and Magnolia River flows in from the east. At the south end, the bay narrows to roughly 100 feet to form the connection with Bon Secour Bay, a connection local interests have named Big Mouth. The average depth of Weeks Bay is approximately 3 feet mean low water. However, the depth increases rapidly in the vicinity of Big Mouth to a maximum depth of about 25 feet, with depths of 7 feet or greater over a distance of roughly 3,000 feet. Point elevations in Weeks Bay indicating depth with reference to mean low water are illustrated in Figure 3. The existing channel as it is marked and presently used by vessel operators is also illustrated in Figure 3. Fish River has adequate natural depth for vessels drafting 5 feet for a distance of approximately 9 river miles upstream to the town of Clay City. Similarly, Magnolia River provides adequate depth for approximately 4 river miles upstream to the town of Magnolia Springs. The Gulf Intracoastal Waterway, a Federal project which provides a protected coastal channel with minimum dimensions of 12 by 125 feet between Carrabelle, Florida, and Brownsville, Texas, traverses Mobile Bay about 6 miles south of Weeks Bay. The purpose of this assessment is to determine the economic losses incurred by commercial and recreational vessels using Weeks Bay as a home port. These losses result from inadequate channel depth under the existing condition, and can be expected to continue to accrue under future without-project conditions. Thus the purpose here is also to determine the extent economic losses can be reduced by implementing the proposed channel improvements. In order to facilitate an accurate economic assessment of proposed channel improvements, the planned projects were evaluated in two segments. The first segment consists of the main channel beginning at the mouth of Fish River and ending at Big Mouth. The second segment consists of a channel beginning at the mouth of Magnolia River and ending at its confluence with the main channel, which is approximately midway between Fish River and Big Mouth.

EXISTING CONDITION VESSEL CHARACTERISTICS

Commercial Vessels: Field data obtained in December 1988 showed that Weeks Bay is the home port for 87 commercial fishing vessels with maximum loaded drafts of 4.5 to 5 feet. A summary of types and number of vessels at both rivers is shown below.

PERMANENT COMMERCIAL VESSEL FLEET

<u>LOADED DRAFT</u>	<u>FISH RIVER</u>	<u>MAGNOLIA RIVER</u>
LARGE(4.5' - 5')	25	0
MEDIUM(3.1' - 4.4')	31	6
SMALL(under 3.0')	19	6
	<hr/> 75	<hr/> 12

The commercial fleet based at Fish River consists of 75 vessels with loaded drafts ranging from under 3.0 feet up to 5.0 feet. In addition to the permanent fleet, local interests report a transient fleet of 14 vessels use the facilities at Fish River Marina during the peak of the shrimping season. These are vessels with loaded drafts of 4.5 feet - 5 feet. Local interests also report that about 20 vessels have been forced to relocate by inadequate channel depth. The commercial fleet at Magnolia River consists of 12 vessels with loaded drafts of 3.0 feet - 4.0 feet. No transient fleet is associated with the Magnolia River fleet since there are no facilities to service such a fleet. Also, there are no reports of forced relocation of vessels previously based at Magnolia River.

Recreational Vessels: The December 1988 field data revealed that Weeks Bay is the home port for 155 recreational vessels. In addition to the vessels based at Weeks Bay, local interests report that a large number of small skiffs use the bay as a launching point but that existing conditions are adequate for safe navigation for the vast majority of these vessels. Maximum draft of these vessels is between 1 and 2 feet. At Fish River, the recreational fleet consists of 105 vessels, including large motor yachts and small to medium power boats. Local interests report that these vessels are owned by residents of the area and are moored at those residences. The recreational fleet based at Magnolia River consists of about 50 vessels with similar fleet

composition, ownership and moorage. A summary of the type and number of vessels in the recreational fleet based at Weeks Bay appears below.

PERMANENT RECREATIONAL FLEET

<u>VESSEL TYPE AND DRAFT</u>	<u>FISH RIVER</u>	<u>MAGNOLIA RIVER</u>
LARGE MOTOR YACHTS (4.5' - 5.0')	30	10
MEDIUM POWERBOATS (3.1' - 4.4')	40	30
SMALL POWERBOATS (under 3.0')	35	10
	105	50

From the field survey in December 1988, it was revealed that Weeks Bay bottom consists of a very soft, silty material and that vessel owners attempt to navigate the channel with no underkeel clearance. As a result, it is assumed that a vessel attempting to navigate the channel with zero underkeel clearance would face a 100 percent probability of incurring damage (one damage event per year) from underkeel obstructions. Such obstructions, including logs, snags, and lost crab traps, are reported to be quite common in the channel. Damage is also reported to result from mud being injected into engine cooling systems through the vessel's water intake valves, which are commonly located on the keel itself. Damages enumerated from interviews were used as the foundation for establishing without project damage costs. Nearly all vessel owners or operators reported damage annually resulting from inadequate channel depth and underkeel obstructions.

Table 2 displays net income for a commercial shrimping vessel in each class and Table 3 illustrates total income by class for the entire fleet under the existing condition.

METHODOLOGY

The methodology for evaluating economic benefits is consistent with Water Resource Council's Principles and Guidelines (Corps of Engineers Regulation ER 1105-2-40). Under the without-project condition, additional economic costs are incurred by commercial vessels due to inadequate channel depth. These costs can be identified through field interviews and expressed in dollar terms. The cost evaluation concentrated primarily on occurrence of vessel damage and repair expense and delay costs of vessel operators. Interviews were conducted with local interests and

detailed information on the economic parameters of vessel operations were obtained from Centaur Associates' Draft Report on Commercial Fishing Cost Return Profiles for Gulf Coast Areas, 1985. Also, a detailed evaluation of the tidal flow in Weeks Bay was performed in order to accurately determine actual intervals during which adequate depth was not available. Finally, calculations in determining vessel damage and delay costs were carefully computed to depict the future without-project as accurately as possible.

Each type of vessel presently using the channel at Weeks Bay is limited in its activities by inadequate depth. Depending on the class and location of the vessels involved, vessel operators will either continue to lose boating opportunities or use the channel if and when it is navigable.

Recreational benefits computed herein are based on the economic concept of lost opportunities. In determining the value of lost opportunities to recreational vessels, the "unit day value" (UDV) method was employed. Although more sophisticated techniques are available and would likely illustrate the value of recreational activities in more detail, the limited number of vessels and modest geographical area involved warrants the use of the less sophisticated UDV method.

Benefits attributable to the various project alternatives are the reductions in vessel operating costs that accrue as a result of the project. The benefits of With-Project conditions are analyzed incrementally. The economic costs illustrated in the without-project condition are shown to have been reduced incrementally by each of the with-project scenarios. The net reduction of costs for each scenario is the cumulative net benefit creditable to that phase. This pattern is repeated and the channel is hypothetically "dredged" one foot at a time, with the net reduction of costs analyzed at each stage of the process. The hypothetical dredging is stopped at the point at which no more benefits accrue (or all costs associated with inadequate depth have been eliminated).

WITHOUT-PROJECT CONDITION VESSEL OPERATING COSTS

Commercial Vessels: The existing condition at Weeks Bay is such that most of the vessels using the channel have drafts that exceed the depth of the channel constraint at mean low water, and that navigability of the channel is limited at other tides. As a result, most of the vessels experience delays while waiting for sufficient depth to enter and/or exit the harbor. Because of the composition of the channel bottom, entries and departures are attempted with no underkeel clearance, often resulting in damage to propellers, shafts, rudders or engines.

Between 1990 and 2040, the time period during which a project could be in place, it was determined through field interviews that the facilities at Weeks Bay will continue to be in high demand. The ratio of commercial to recreational vessels is expected to remain similar to the present ratio, and assuming that the channel's controlling depth will remain constant, the loaded drafts of the fleet will remain constant as well. Net operating revenues illustrated in Tables 2 and 3 are stated in 1988 prices. Finally, navigability of the channel is expected to remain stable in the future. As a result of these conditions, the operational costs associated with delays are not expected to increase over the time period. Costs associated with damages are not expected to grow, since vessel operators attempt navigation with zero underkeel clearance and the channel bottom's composition is such that it is easily pushed out by vessel keels.

The existing condition channel has a controlling depth of 2.3 feet at mean low water (MLW). A graphical depiction of the daily tides for 1987 appears in Figures 2 - 13, found in the appendix of this report. The graphs display a plot of actual (astronomical plus wind effects) tides for each day of each month for 1987. Also shown are controlling depth of the channel and depths necessary for the safe navigation of the three vessel draft categories. The graphs were constructed to illustrate the points in time during which each vessel draft category, with zero underkeel clearance, could safely navigate the channel. The representations were constructed to illustrate the change in water surface elevation from its daily high tide peak to its lowest elevation at low tide and the return to the peak elevation.

The graphical representation was derived from the 1987 series of low and high tides and is based on daily extreme tides occurring at the northern side of Dauphin Island, where tides are believed to be similar in height and duration to those at Weeks Bay. Elevations for those tides were based on mean lower low water (MLLW) and were converted to National Geodetic Vertical Datum (NGVD) heights. The actual tide gauge data were used and frequency analyses were performed to determine the percentage of time that required water depths were available. The gauge located at Dauphin Island records the heights of daily tides and the data used for this analysis spans a time period of record from 1963 to 1987. Channel navigability, or percent of time channel depth is adequate, was based on the actual percent of time that a given water surface elevation was equaled or exceeded over the entire time period of record. Tidal heights associated with each duration were converted to NGVD. Wind effects are reflected in the tidal data and are also believed to be similar to those at Weeks Bay. A graphic illustration of channel depth availability appears in the appendix as well (See Figure 14).

Examination of the plots for each month clearly illustrates that vessels encounter inadequate depth quite often. Also shown clearly are very long periods of successive days during which the channel depth fails to reach a level sufficient for safe operations. Only the shallower draft vessels appear to be able to navigate the existing channel with any frequency, and inspection of the plots indicates that they too encounter difficulty fairly often.

Due to the inadequate depth of the channel at Weeks Bay, the vessels located in the harbor are experiencing additional costs from damages and delays. These inefficiencies were quantified in Tables 4 through 7. Table 4 illustrates total average annual equivalent damages incurred by the commercial and recreational fleet of \$40,500, as well as a breakdown of damage by draft, vessel class, river and specific damage event. Table 5 shows total average annual equivalent costs resulting from delays of commercial vessels totalling \$228,100. The following paragraphs contain a description of how damages and delays were calculated.

The without-project damages were calculated using several parameters. Damages occur from navigation of the channel with zero underkeel clearance. All of the vessels owners attempt navigation while fully loaded, citing cheaper fuel, ice and provision costs as their rationale. The average annual equivalent damages cited in Table 4 are based on information obtained through field interviews and are actual damage events for 1987, which local interests report as a typical year for vessel damage. The information was categorized by damage event and vessel draft, and a mean of the costs for each event and draft category was calculated to ascertain an annual per vessel damage for that year.

Damages are not expected to grow in the future without-project condition, since the controlling depth of the channel is expected to remain constant. In addition, the soft composition of the channel bottom allows vessels to push through when near adequate depth is available and maintain the existing depth.

Table 5 illustrates the costs incurred by the commercial vessels at Weeks Bay that experience delays due to inadequate depth. The vessels using Weeks Bay depart and arrive in random order (various departure times and trip duration). Delays experienced by vessels awaiting adequate depth are quite common. The costs associated with delays were computed using actual tidal statistics, relating water surface elevation to vessel draft and computing the percent of time adequate depth is not available in a representative year, 1986 in this case. The percent of time adequate depths were not available was then multiplied by the number of annual trips an average vessel of that draft at Weeks Bay makes to determine the number of trips delayed. Trips delayed was then multiplied by the average delay time of 6 hours (found through field interviews to be the average amount of time the

captain would wait) to arrive at the total annual hours a vessel is delayed. This in turn is multiplied by the number of vessels in the fleet within that draft category and the product is multiplied by the hourly variable operating cost of the vessel to produce the total annual delay cost. The formula appears below (See Table 5).

$$\begin{aligned}P \times Ty &= Td \\Td \times Ha &= Ht \\Ht \times N \times Cv &= Ct\end{aligned}$$

Where: P = Percent of time not available
Ty = Trips per year
Td = Total trips delayed per year
Ha = Average hours per delay
Ht = Total hours delayed annually
N = Number of vessels
Cv = Variable operating cost
Ct = Total annual delay cost

Table 2 shows revenues derived from commercial fishing by vessel draft under the without project conditions. The source for the income and revenues data was Centaur Associates, Inc., Draft Report on Commercial Fishing Cost Return Profiles for Gulf Coast Areas.

From a field survey in December 1988, it was determined that the number of trips per year undertaken by Weeks Bay fishermen very nearly corresponds with data published by Centaur for average fishermen. This correlation was used to calculate revenues for the Weeks Bay commercial fleet. Net revenues totalled \$704,742, as illustrated on Table 3, and were arrived at by subtracting variable costs from total fishing revenues. The difference was then multiplied by the number of vessels to produce total net revenue.

Recreational Vessels: To estimate the willingness of recreational users to pay for the resources at Weeks Bay the UDV method was chosen and related to the percent of time without adequate depth. Ranges of points are assigned to various criteria that might ordinarily be used to evaluate a particular site for recreational activities. The data is then assembled into a matrix and the site is given total score based on its features and how they are scored by the matrix.

The total score is then converted to dollar terms in order to determine unit day values per recreational trip. The National Economic Development (NED) benefits are reductions in losses incurred from the net decrease in opportunities to engage in recreational boating activities, and are computed as the average annual number of lost boating opportunities multiplied by the unit day value outlined above. Under ordinary conditions, it is

assumed that a larger recreational vessel can accommodate a larger number of passengers, causing unit day values to be higher for those vessels. The following are the criteria used to judge the features of Weeks Bay, as well as their score and rationale for being scored the way they were:

a. Recreation experience: 9 points. There are two general activities in the project area, recreational boating and sportfishing, which is reported to be quite good.

b. Availability of opportunity: 5 points. there are several areas in the vicinity of Weeks Bay at which vessel owners can enjoy nearly the same types of activities.

c. Carrying capacity: 3 points. Two boat launches exist at Weeks Bay, one at Fish River Marina and one at Big Mouth. Both are very basic and are not equipped to handle large numbers of vessels.

d. Accessibility: 11 points. Both boat launches are easily accessible via U.S. Highway 98, although neither have high quality surface within them.

e. Environmental quality: 12 points. Weeks Bay is a National Estuarine Sanctuary, and ranks very highly with local boaters and fishermen, who cite excellent fishing and natural beauty.

Fifty (50) recreational vessels are located at Magnolia River and '05 are located at Fish River, and it is assumed that each vessel is experiencing lost boating activities. The total value of lost opportunities based on the matrix on table 6 is \$5,400 for the vessels at Magnolia River and the value for Fish River is \$11,000. Table 7 illustrates without-project recreational delay costs. Through field interviews it was determined that recreational vessel operators attempt navigation only when adequate depth is available and rarely incur damages. For this reason, recreational damages are assumed to be minimal.

ALTERNATIVES CONSIDERED

Weeks Bay was analyzed as two project segments, consisting of the main channel and an adjoining channel beginning at the Mouth of Magnolia River and meeting the main channel roughly midway between the mouth of Fish River and Big Mouth. The plans evaluated herein would provide for a channel through the bay with a bottom width of 60 feet and depth beginning at 3 feet and increased by one foot increments to the depth at which full benefits accrue. This process is done for both project segments and benefits are shown for each segment and by vessel draft.

WITH PROJECT CONDITION BENEFITS

Four alternatives for each of the two channel segments at Weeks Bay are illustrated in the following paragraphs. The plans are for channel depths of 3, 4, 5 and 6 foot channels at mean low water in both segments. there are 3 types of benefits creditable to the plans considered: damage reduction, delay reduction and recreational benefits. Benefits derived from each alternative are displayed according to vessel type (recreational or commercial) and draft. Through field interviews it was determined that Weeks Bay fishermen consider long term berthing at an alternative facility (such as Bon Secour) too costly, and it was revealed that the operators of Fish River Marina sell provisions such as ice, fuel, gear and dry goods to vessel operators at wholesale price plus sales taxes. Therefore no consideration was given to permanent use of an alternative port. This is discussed in more detail later in this section.

Commercial Vessels: Benefits derived from damage reduction were based on the ability of a vessel with a given draft to navigate the new channel with zero underkeel clearance. The net damage reduction as well as remaining damages are then shown for each vessel type and draft. Tables 8 through 11 show reduced and remaining damages for both channel segments and all alternatives.

Benefits credited to delay reduction were calculated based upon the extent to which each alternative permits a vessel with a given draft to enter and exit the bay at random with zero underkeel clearance. All of the alternative projects are assessed for the commercial fleet in Tables 12 through 15, and the benefits derived are calculated based on the probability of inadequate depth being encountered as a result of the new channel. This factor is then multiplied by annual trips made, number of vessels of that particular draft, and the variable operating cost associated with that draft to arrive at the total delay cost of the alternative. The benefit creditable to the alternative is the difference between the without and with project delay cost and are shown in "total annual delay reduced" column of Tables 12 through 15. Also shown are delays remaining as a result of the new channel.

Because Fish River Marina sells provisions at reduced prices, vessel owners prefer to fully load their vessels and attempt navigation at high tide. Provisions are sold to vessel operators at wholesale prices plus sales taxes. In addition, the marina charges no dockage fees. Because of these factors and the near capacity operations at Bon Secour and Dauphin Island, vessel operators expressed opposition to diverting to an alternative port. Therefore no benefits accrue as a result of lightloading or detours being eliminated by the alternative projects.

Percent of time without adequate depth, upon which all with project condition benefits are based, is derived from statistical data for the high tide duration at the Dauphin Island tidal gauge and spans a time period of record between 1963 and 1987. Time without adequate depth was computed by subtracting the percent of time an NGVD depth was exceeded from 100. The data for the entire time period was used to reduce the probability of statistical outliers causing inaccuracies in with-project condition benefit calculations.

Recreational Vessels: Lost recreational boating opportunities are computed using the unit day value method. Delay reduction was computed by multiplying the unit day value of recreational activities at Weeks Bay by the total number of visitors (number of vessels x the number of visitors per vessel). The product is then multiplied by the percent of time without adequate depth to arrive at the total cost of recreational delays. Tables 20 through 23 illustrate increased recreational activity benefits.

SUMMARY

A summary of the benefits appears in Tables 25 and 26. The summary categorizes the benefits by benefit type, channel segment, vessel type, vessel draft and alternative proposed.

SENSITIVITY ANALYSIS

The estimated average annual benefit of \$285,000 is based on an underlying assumption that the without-project condition channel depth will continue to remain 2.3 feet at mean low water. Given the conditions imposed by this assumption, this evaluation provides the maximum potential benefit creditable to the project. An alternative concept would be to relax the assumption of a constant channel depth and allow the fleet at Weeks Bay to react to worsening channel conditions, the most logical reaction being diversion to an alternative port. Bon Secour is the nearest such alternative, and is located roughly 13 miles from Fish River and 10 miles from Magnolia River. The costs then under the without-project condition would consist of travel costs of commuting to and from Bon Secour and the costs of constructing a new processing plant at the alternative site. An enumeration of commuting costs appear on Table 27 and total \$29,100. The costs of constructing a new processing facility are estimated to be \$54,020 on an average annual equivalent basis. The sum of the costs of commuting and constructing the new facility total \$83,120 and are the lowest alternative costs to those presented in this report. Assuming that one-half of the fleet diverted to Bon Secour and one-half remained, the creditable benefits would total \$184,060. However, the Mobile District Office has concluded that the selection of the without-project condition illustrated in this report is accurate, and total benefits are \$285,000.

TABLE 1
POPULATION STATISTICS FOR
WEEKS BAY STUDY AREA
1986

CITY/TOWN	POPULATION	PERCENT OF STUDY AREA	PERCENT OF COUNTY
ALABAMA	238,740,000		
BALDWIN COUNTY 1/	86,900		
FAIRHOPE	7,720	33.58%	8.88%
FOLEY	4,330	18.83%	4.98%
DAPHNE	3,830	16.66%	4.41%
ROBERTSDALE	2,450	10.66%	2.82%
GULF SHORES	2,020	8.79%	2.32%
LOXLEY	860	3.74%	0.99%
SILVERHILL	620	2.70%	0.71%
SUMMERDALE	610	2.65%	0.70%
ELBERTA	550	2.39%	0.63%
TOTALS	22,390	100.00%	26.46%

SOURCES: "ECONOMIC ABSTRACT OF ALABAMA," 1987

"ALABAMA COUNTY DATA BOOK," 1985

"ALABAMA MUNICIPAL DATA BOOK," 1985

1/: BALDWIN COUNTY REPRESENTS .04% OF STATE TOTAL.

TABLE 2
SHRIMP VESSEL INCOME DATA BY DRAFT
EXISTING CONDITION

WITHOUT PROJECT CATEGORIES CATEGORIES		2.6' TO 3.5' SHRIMPER	3.6' TO 5.0' SHRIMPER	5.0' + SHRIMPER
ANNUAL REVENUE	(1)	\$25,910	\$31,398	\$40,401
FIXED COSTS	(1)	\$5,537	\$6,904	\$7,971
VARIABLE COSTS	(1)	\$12,249	\$19,426	\$24,591
WAGES AND PROFITS	(2)	\$8,124	\$5,068	\$7,839
CAPTAINS WAGE LESS DEPR(1)		\$8,124	5068	\$7,839
VAR OPER COST/CAPT WAGE(1)		\$5.51	\$6.42	\$10.47
# ANNUAL TRIPS FISHING	(1)	94	72	63
# ANNUAL DAYS FISHING	(1)	154	159	129
REVENUE PER DAY	(3)	\$168	\$197	\$313

- (1) DRAFT REPORT ON COMMERCIAL FISHING COST RETURN PROFILES FOR GULF COAST AREAS,
JAN, 1985 PP2-48 TO 2-25 AND 2-27 TO 2-28
- (2) IBID. CAPTAIN /OWNER RETURN ITH DEPRECIATION EQUALS REVENUE MINUS FIXED AND VARIABLE COSTS
- (3) ANNUAL REVENUE DIVIDED BY ANNUAL DAYS FISHING

TABLE 3
NET SHRIMPING REVENUE
EXISTING CONDITION
2.3' CHANNEL @ MLW

VESSEL/DRAFT	CHANNEL DEPTH (MLW)	1/ TOTAL ANNUAL REVENUE	2/ FIXED + - VARIABLE COSTS	3/ NUMBER OF x VESSELS =	4/ TOTAL NET REVENUE
FISH RIVER					
5' DRAFT	2.3'	\$40,401	\$32,430	39	\$310,869
4' DRAFT	2.3'	\$31,398	\$24,494	31	\$214,024
3' DRAFT	2.3'	\$25,910	\$20,373	19	\$105,203
SUBTOTALS		\$97,709	\$77,297	89	\$630,096
MAGNOLIA RIVER					
5' DRAFT	2.3'	\$40,401	\$32,430	0	\$0
4' DRAFT	2.3'	\$31,398	\$24,494	6	\$41,424
3' DRAFT	2.3'	\$25,910	\$20,373	6	\$33,222
SUBTOTALS		\$97,709	\$77,297	12	\$74,646
TOTALS				101	\$704,742

1/ TABLE 2: VESSEL INCOME DATA BY DRAFT

2/ TABLE 5: COLUMN 8, NUMBER OF VESSELS

3/ TOTAL NET REVENUE = TOTAL ANNUAL REVENUE - FIXED
AND VARIABLE COSTS X NUMBER OF VESSELS.

TABLE 4
AVERAGE ANNUAL VESSEL COSTS
DUE TO DAMAGES: WITHOUT-PROJECT CONDITION

SEGMENT/VESSEL/DRAFT	CHANNEL DEPTH	AVERAGE ANNUAL DAMAGE	NUMBER OF VESSELS	TOTAL ANNUAL DAMAGE	AVERAGE ANNUAL EQUIVALENT DAMAGES
FISH RIVER: 2.3' @ MLW					
COMMERCIAL VESSELS					
5' DRAFT FULLY LOADED	2.3'		39		
PROP/SHAFT DAMAGE		\$267			
RUDDER DAMAGE		\$143		\$19,800	\$19,800
ENGINE DAMAGE		\$98			
4' DRAFT FULLY LOADED	2.3'		31		
PROP/SHAFT DAMAGE		\$223			
RUDDER DAMAGE		\$95		\$11,900	\$11,900
ENGINE DAMAGE		\$65			
3' DRAFT FULLY LOADED	2.3'		19		
PROP/SHAFT DAMAGE		\$178			
RUDDER DAMAGE		\$48		\$4,900	\$4,900
ENGINE DAMAGE		\$33			
SUBTOTAL			50	\$36,600	\$36,600
MAGNOLIA RIVER: 2.3' @ MLW					
COMMERCIAL VESSELS					
5' DRAFT FULLY LOADED	2.3'		0		
PROP/SHAFT DAMAGE		\$0			
RUDDER DAMAGE		\$0		\$0	\$0
ENGINE DAMAGE		\$0			
4' DRAFT FULLY LOADED	2.3'		6		
PROP/SHAFT DAMAGE		\$223			
RUDDER DAMAGE		\$95		\$2,300	\$2,300
ENGINE DAMAGE		\$65			
3' DRAFT FULLY LOADED	2.3'		6		
PROP/SHAFT DAMAGE		\$178			
RUDDER DAMAGE		\$48		\$1,600	\$1,600
ENGINE DAMAGE		\$33			
SUBTOTAL			12	\$3,900	\$3,900
TOTALS			101	\$40,500	\$40,500

TABLE 5
WITHOUT-PROJECT CONDITION
AVERAGE ANNUAL VESSEL COSTS BY DRAFT DUE TO DELAYS

WITHOUT PROJECT CONDITIONS HARBOR/VESSEL/DRAFT	1/ CHANNEL DEPTH	2/ HOURS AT DEPTH	3/ TIME W/OUT ADEQ. DEPTH	4/ NO OF YR TRIPS	5/ NO ANNUAL TRIPS DELAYED	6/ AVERAGE DELAY IN HOURS	7/ TOTAL HRS VSL DELAY	8/ VARIABLE OPER COST	1986 TOTAL ANNUAL DELAY COST
FISH RIVER: 2.3' MLW									
5'DRAFT FULLY LOADED	2.3'	0.27	98.919	63	62.32	6.0	373.91	\$10.47	\$152,700
4'DRAFT FULLY LOADED	2.3'	7.94	68.474	72	49.30	6.0	295.81	\$6.42	\$58,909
3'DRAFT FULLY LOADED	2.3'	23.54	6.591	94	6.20	6.0	37.17	\$5.51	\$3,900
MAGNOLIA RIVER: 2.3' MLW									
5'DRAFT FULLY LOADED	2.3'	0.27	98.919	63	62.32	6.0	373.91	\$10.47	\$0
4'DRAFT FULLY LOADED	2.3'	7.94	68.474	72	49.30	6.0	295.81	\$6.42	\$11,400
3'DRAFT FULLY LOADED	2.3'	23.54	6.591	94	6.20	6.0	37.17	\$5.51	\$1,200
TOTAL							101		\$228,100

1/: CHANNEL DEPTH IS 2.3' MLW AT ITS SHALLOWEST POINT.

2/: PERCENT OF TIME NOT EXCEEDED (1975-1987 HIGH DURATION) MULTIPLIED BY 25.2 HOURS.

3/: TIDAL GAUGE DATA FOR PERIOD OF RECORD (1963 THRU 1987).

4/: DRAFT REPORT ON COMMERCIAL FISHING COST RETURN PROFILES FOR GULF COAST AREA, CENTAUR ASSOCIATES 1975

5/: PROBABILITY OF DELAY MULTIPLIED BY THE NUMBER OF TRIPS PER YEAR.

(PROBABILITY OF DELAY = % OF TIME W/O ADEQUATE DEPTH.)

6/: IN FIELD INTERVIEWS IT WAS DETERMINED THAT THE AVERAGE DELAY PER TRIP DELAYED WAS SIX HOURS AWAITING ADEQUATE DEPTH.

7/: NO OF TRIPS DELAYED MULTIPLIED BY AVERAGE ANNUAL DELAY.

8/: TABLE 5, ANNUAL VARIABLE COSTS (INCLUDING CAPTAINS WAGES) WERE DIVIDED BY THE ANNUAL HOURS FISHING.

HOURS WORKED PER TRIP WERE ESTIMATED TO BE THE DAYS FISHED MULTIPLIED BY 24 HRS.

TABLE 6
MATRIX FOR COMPUTATION
OF UNIT DAY VALUE

CRITERIA

RECREATION EXPERIENCE POINTS POSSIBLE: 30 WEEKS DAY SCORE: 9	TWO GENERAL ACTIVITIES	SEVERAL GENERAL ACTIVITIES	SEVERAL; ONE OF HIGH QUALITY	SEVERAL; MORE THAN ONE HIGH QUALITY	MANY HIGH QUALITY; A FEW GENERAL
SCALE	0-4	5-10	11-16	17-23	24-30
OPPORTUNITY AVAILABILITY POINTS POSSIBLE: 18 WEEKS DAY SCORE: 5	SEVERAL WITHIN 1 HR; A FEW WITHIN 1/2 HR	SEVERAL WITHIN 1 HR; NONE WITHIN 1/2 HR	1 OR 2 WITHIN 1 HR; NONE WITHIN 3/4 HR	NONE WITHIN 1 HOUR	NONE WITHIN 2 HOURS
SCALE	0-3	4-6	7-10	11-14	15-18
CARRYING CAPACITY POINTS POSSIBLE: 14 WEEKS DAY SCORE: 8	MINIMUM FACILITY DEVELOPMENT	BASIC FACILITY DEVELOPMENT	ADEQUATE FACILITY W/O HURTING ACTIVITY	OPTIMUM FACILITY DEVELOPMENT	ULTIMATE FACILITY DEVELOPMENT
SCALE	0-2	3-5	6-8	9-11	12-14
ACCESSIBILITY POINTS POSSIBLE: 18 WEEKS DAY SCORE: 11	LIMITED ACCESS TO OR WITHIN SITE	FAIR ACCESS; POOR ROADS TO; LIMITED WITHIN SITE	FAIR ACCESS, FAIR ROADS TO SITE; FAIR ACCESS, GOOD WITHIN	GOOD ACCESS, GOOD ROADS TO SITE; FAIR ACCESS, GOOD WITHIN	GOOD ACCESS, VERY GOOD ROADS TO; GOOD ROADS WITHIN SITE
SCALE	0-3	4-6	7-10	11-14	15-18
ENVIRONMENTAL QUALITY POINTS POSSIBLE: 18 WEEKS DAY SCORE: 12	LOW ESTHETIC FACTORS THAT SIGNIFICANTLY LOWER QUALITY	AVERAGE ESTH- ETIC QUALITY; MINOR DEGREE OF REDUCTION	ABOVE AVERAGE QUALITY; LIMITING FAC- TORS RIGHTED REASONABLY	HIGH ESTHETIC QUALITY; NO FACTORS THAT LOWER QUALITY	OUTSTANDING ESTHETICS; NO FACTORS THAT LOWER QUALITY
SCALE	0-2	3-6	7-10	11-14	15-18
TOTAL POINTS POSSIBLE: 90					
TOTAL WEEKS DAY SCORE: 40					
POINTS:	0	10	20	30	40
CONVERSION FACTORS:					
DOLLARS:	\$1.95	\$2.25	\$2.60	\$3.00	\$3.45
POINTS:	50	60	70	80	90
CONVERSION FACTORS:					
DOLLARS:	\$4.15	\$4.45	\$4.80	\$5.15	\$5.45
					\$5.80

TABLE 7
AVERAGE ANNUAL RECREATIONAL VESSEL COSTS BY DRAFT
WITHOUT-PROJECT CONDITION

HARBOR/VESSEL/DRAFT	1/ ANNUAL VALUE OF LOST BOATING OPPORTUNITIES	NUMBER OF VESSELS	2/ NUMBER OF VISITORS PER VESSEL	TOTAL ANNUAL RECREATIONAL VALUE	3/ PERCENT OF TIME W/O ADEQUATE DEPTH	TOTAL ANNUAL DELAYS
FISH RIVER						
5.0' DRAFT FULLY LOADED	\$42	30	5.5	\$6,900	98.989	\$6,800
4.0' DRAFT FULLY LOADED	\$42	40	3.5	\$5,900	68.474	\$4,000
3.0' DRAFT FULLY LOADED	\$42	35	2.5	\$3,700	6.591	\$200
SUBTOTAL				\$16,500		\$11,000
MAGNOLIA RIVER						
5.0' DRAFT FULLY LOADED	\$42	10	5.5	\$2,300	98.989	\$2,300
4.0' DRAFT FULLY LOADED	\$42	30	3.5	\$4,400	68.474	\$3,000
3.0' DRAFT FULLY LOADED	\$42	10	2.5	\$1,100	6.591	\$100
SUBTOTAL				\$7,800		\$5,400
WEEKS BAY TOTAL				\$24,300		\$16,400

1/: UNIT DAY VALUE OF A TRIP TO WEEKS BAY TIMES THE NUMBER OF ANNUAL TRIPS

2/: "BUREAU OF OUTDOOR RECREATION STANDARDS BOOK"; OUTDOOR RECREATION SPACE
STANDARDS FOR ALL TYPES OF ACTIVITIES, APRIL 1967.

3/: FROM TABLE 3 COLUMN 3

TABLE 8
AVERAGE ANNUAL VESSEL COSTS
DUE TO DAMAGES: WITH PROJECT CONDITION 3.0' CHANNEL

SEGMENT/VESSEL/DRAFT	CHANNEL DEPTH	AVERAGE ANNUAL DAMAGE	NUMBER OF VESSELS	TOTAL ANNUAL DAMAGE	AVERAGE ANNUAL EQUIVALENT DAMAGES	ANNUAL DAMAGE REDUCTION
FISH RIVER: 3.0' @ MLW						
COMMERCIAL VESSELS						
5' DRAFT FULLY LOADED	3.0'		39			
PROP/SHAFT DAMAGE		\$267				
RUDDER DAMAGE		\$143		\$19,800	\$19,800	\$0
ENGINE DAMAGE		\$98				
4' DRAFT FULLY LOADED	3.0'		31			
PROP/SHAFT DAMAGE		\$223				
RUDDER DAMAGE		\$95		\$11,900	\$11,900	\$0
ENGINE DAMAGE		\$65				
3' DRAFT FULLY LOADED	3.0'		19			
PROP/SHAFT DAMAGE		\$178				
RUDDER DAMAGE		\$48		\$4,900	\$4,900	\$0
ENGINE DAMAGE		\$33				
SUBTOTAL			50	\$36,600	\$36,600	\$0
MAGNOLIA RIVER: 3.0' @ MLW						
COMMERCIAL VESSELS						
5' DRAFT FULLY LOADED	3.0'		0			
PROP/SHAFT DAMAGE		\$0				
RUDDER DAMAGE		\$0		\$0	\$0	\$0
ENGINE DAMAGE		\$0				
4' DRAFT FULLY LOADED	3.0'		6			
PROP/SHAFT DAMAGE		\$223				
RUDDER DAMAGE		\$95		\$2,300	\$2,300	\$0
ENGINE DAMAGE		\$65				
3' DRAFT FULLY LOADED	3.0'		6			
PROP/SHAFT DAMAGE		\$178				
RUDDER DAMAGE		\$48		\$1,600	\$1,600	\$0
ENGINE DAMAGE		\$33				
SUBTOTAL			12	\$3,900	\$3,900	\$0
TOTALS			101	\$40,500	\$40,500	\$0

TABLE 9
AVERAGE ANNUAL VESSEL COSTS
DUE TO DAMAGES: WITH-PROJECT CONDITION 4.0' CHANNEL

SEGMENT/VESSEL/DRAFT	CHANNEL DEPTH	AVERAGE ANNUAL DAMAGE	NUMBER OF VESSELS	TOTAL ANNUAL DAMAGE	AVERAGE ANNUAL EQUIVALENT DAMAGES	ANNUAL DAMAGE REDUCTION
FISH RIVER: 4.0' @ MLW						
COMMERCIAL VESSELS						
5' DRAFT FULLY LOADED	4.0'		39			
PROP/SHAFT DAMAGE		\$267				
RUDDER DAMAGE		\$143		\$19,800	\$19,800	\$0
ENGINE DAMAGE		\$98				
4' DRAFT FULLY LOADED	4.0'		31			
PROP/SHAFT DAMAGE		\$223				
RUDDER DAMAGE		\$95		\$11,900	\$11,900	\$0
ENGINE DAMAGE		\$65				
3' DRAFT FULLY LOADED	4.0'		19			
PROP/SHAFT DAMAGE		\$0				
RUDDER DAMAGE		\$0		\$0	\$0	\$4,900
ENGINE DAMAGE		\$0				
SUBTOTAL			50	\$31,700	\$31,700	\$4,900
MAGNOLIA RIVER: 4.0' @ MLW						
COMMERCIAL VESSELS						
5' DRAFT FULLY LOADED	4.0'		0			
PROP/SHAFT DAMAGE		\$0				
RUDDER DAMAGE		\$0		\$0	\$0	\$0
ENGINE DAMAGE		\$0				
4' DRAFT FULLY LOADED	4.0'		6			
PROP/SHAFT DAMAGE		\$223				
RUDDER DAMAGE		\$95		\$2,300	\$2,300	\$0
ENGINE DAMAGE		\$65				
3' DRAFT FULLY LOADED	4.0'		6			
PROP/SHAFT DAMAGE		\$0				
RUDDER DAMAGE		\$0		\$0	\$0	\$1,600
ENGINE DAMAGE		\$0				
SUBTOTAL			12	\$2,300	\$2,300	\$1,600
TOTALS			101	\$34,000	\$34,000	\$6,500

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TABLE 10
AVERAGE ANNUAL VESSEL COSTS
DUE TO DAMAGES: WITH-PROJECT CONDITION 5.0' CHANNEL

SEGMENT/VESSEL/DRAFT	CHANNEL DEPTH	AVERAGE ANNUAL DAMAGE	NUMBER OF VESSELS	TOTAL ANNUAL DAMAGE	AVERAGE ANNUAL EQUIVALENT DAMAGES	ANNUAL DAMAGE REDUCTION
FISH RIVER: 5.0' @ MLW						
COMMERCIAL VESSELS						
5' DRAFT FULLY LOADED	5.0'		39			
PROP/SHAFT DAMAGE		\$267				
RUDDER DAMAGE		\$143		\$19,800	\$19,800	\$0
ENGINE DAMAGE		\$98				
4' DRAFT FULLY LOADED	5.0'		31			
PROP/SHAFT DAMAGE		\$0				
RUDDER DAMAGE		\$0		\$0	\$0	\$11,900
ENGINE DAMAGE		\$0				
3' DRAFT FULLY LOADED	5.0'		19			
PROP/SHAFT DAMAGE		\$0				
RUDDER DAMAGE		\$0		\$0	\$0	\$4,900
ENGINE DAMAGE		\$0				
SUBTOTAL			50	\$19,800	\$19,800	\$16,800
MAGNOLIA RIVER: 5.0' @ MLW						
COMMERCIAL VESSELS						
5' DRAFT FULLY LOADED	5.0'		0			
PROP/SHAFT DAMAGE		\$0				
RUDDER DAMAGE		\$0		\$0	\$0	\$0
ENGINE DAMAGE		\$0				
4' DRAFT FULLY LOADED	5.0'		6			
PROP/SHAFT DAMAGE		\$0				
RUDDER DAMAGE		\$0		\$0	\$0	\$2,300
ENGINE DAMAGE		\$0				
3' DRAFT FULLY LOADED	5.0'		6			
PROP/SHAFT DAMAGE		\$0				
RUDDER DAMAGE		\$0		\$0	\$0	\$1,600
ENGINE DAMAGE		\$0				
SUBTOTAL			12	\$0	\$0	\$3,900
TOTALS			101	\$19,800	\$19,800	\$20,700

TABLE 11
AVERAGE ANNUAL VESSEL COSTS
DUE TO DAMAGES: WITH-PROJECT CONDITION 6.0' CHANNEL

SEGMENT/VESSEL/DRAFT	CHANNEL DEPTH	AVERAGE ANNUAL DAMAGE	NUMBER OF VESSELS	TOTAL ANNUAL DAMAGE	AVERAGE ANNUAL EQUIVALENT DAMAGES	ANNUAL DAMAGE REDUCTION
FISH RIVER: 6.0' @ MLW						
COMMERCIAL VESSELS						
5' DRAFT FULLY LOADED	6.0'		39			
PROP/SHAFT DAMAGE		\$0				
RUDDER DAMAGE		\$0		\$0	\$0	\$19,800
ENGINE DAMAGE		\$0				
4' DRAFT FULLY LOADED	6.0'		31			
PROP/SHAFT DAMAGE		\$0				
RUDDER DAMAGE		\$0		\$0	\$0	\$11,900
ENGINE DAMAGE		\$0				
3' DRAFT FULLY LOADED	6.0'		19			
PROP/SHAFT DAMAGE		\$0				
RUDDER DAMAGE		\$0		\$0	\$0	\$4,900
ENGINE DAMAGE		\$0				
SUBTOTAL			50	\$0	\$0	\$36,600
MAGNOLIA RIVER: 6.0' @ MLW						
COMMERCIAL VESSELS						
5' DRAFT FULLY LOADED	6.0'		0			
PROP/SHAFT DAMAGE		\$0				
RUDDER DAMAGE		\$0		\$0	\$0	\$0
ENGINE DAMAGE		\$0				
4' DRAFT FULLY LOADED	6.0'		6			
PROP/SHAFT DAMAGE		\$0				
RUDDER DAMAGE		\$0		\$0	\$0	\$2,300
ENGINE DAMAGE		\$0				
3' DRAFT FULLY LOADED	6.0'		6			
PROP/SHAFT DAMAGE		\$0				
RUDDER DAMAGE		\$0		\$0	\$0	\$1,600
ENGINE DAMAGE		\$0				
SUBTOTAL			12	\$0	\$0	\$3,900
TOTALS			101	\$0	\$0	\$40,500

TABLE 12
WITH-PROJECT CONDITION DREDGED TO 3.0 FEET MEAN LOW WATER
AVERAGE ANNUAL VESSEL COSTS BY DRAFT DUE TO DELAYS

WITH PROJECT CONDITIONS HARBOR/VESSEL/DRAFT	1/ CHANNEL DEPTH	2/ HOURS AT DEPTH	3/ TIME W/OUT ADEQ. DEPTH	4/ NO OF YR TRIPS	5/ NO ANNUAL TRIPS DELAYED	6/ AVERAGE DELAY IN HOURS	7/ TOTAL HRS VSL DELAY	8/ VARIABLE OPER COST	9/ TOTAL ANNUAL DELAY COST	9/ TOTAL ANNUAL DELAY REDUCED
FISH RIVER: 3.0' MLW										
5'DRAFT FULLY LOADED	3.0'	5.65	77.563	63	48.86	6.0	293.19	\$10.47	\$119,700	\$33,000
4'DRAFT FULLY LOADED	3.0'	21.34	15.299	72	11.02	6.0	66.09	\$6.42	\$13,200	\$45,700
3'DRAFT FULLY LOADED	3.0'	24.93	1.070	94	1.01	6.0	6.03	\$5.51	\$600	\$3,300
MAGNOLIA RIVER: 3.0' MLW										
5'DRAFT FULLY LOADED	3.0'	5.65	77.563	63	48.86	6.0	293.19	\$10.47	\$0	\$0
4'DRAFT FULLY LOADED	3.0'	21.34	15.299	72	11.02	6.0	66.09	\$6.42	\$2,500	\$8,900
3'DRAFT FULLY LOADED	3.0'	24.93	1.070	94	1.01	6.0	6.03	\$5.51	\$200	\$1,000
TOTAL							101		\$136,200	\$91,900

1/: CHANNEL DEPTH IS 3.0' MLW AT ITS SHALLOWEST POINT.

2/: PERCENT OF TIME NOT EXCEEDED (1975-1987 HIGH DURATION) MULTIPLIED BY 25.2 HOURS.

3/: TIDAL GAUGE DATA FOR PERIOD OF RECORD (1963 THRU 1987).

4/: DRAFT REPORT ON COMMERCIAL FISHING COST RETURN PROFILES FOR GULF COAST AREA, CENTAUR ASSOCIATES 1975

5/: PROBABILITY OF DELAY MULTIPLIED BY THE NUMBER OF TRIPS PER YEAR.

(PROBABILITY OF DELAY = % OF TIME W/O ADEQUATE DEPTH.)

6/: IN FIELD INTERVIEWS IT WAS DETERMINED THAT THE AVERAGE DELAY PER TRIP DELAYED WAS SIX HOURS AWAITING ADEQUATE DEPTH.

7/: NO OF TRIPS DELAYED MULTIPLIED BY AVERAGE ANNUAL DELAY.

8/: TABLE 5, ANNUAL VARIABLE COSTS (INCLUDING CAPTAINS WAGES) WERE DIVIDED BY THE ANNUAL HOURS FISHING.

HOURS WORKED PER TRIP WERE ESTIMATED TO BE THE DAYS FISHED MULTIPLIED BY 24 HRS.

TABLE 13
WITH-PROJECT CONDITIONS DREDGED TO 4.0 FEET MEAN LOW WATER
AVERAGE ANNUAL VESSEL COSTS BY DRAFT DUE TO DELAYS

WITH PROJECT CONDITIONS HARBOR/VESSEL/DRAFT	1/ CHANNEL DEPTH	2/ HOURS AT DEPTH	3/ TIME W/OUT ADEQ. DEPTH	4/ NO OF YR TRIPS	5/ NO ANNUAL TRIPS DELAYED	6/ AVG HRS DELAYED ON TRIP DELAYED	7/ TOTAL HRS VSL DELAY	8/ NO OF VESSELS	VARIABLE OPER COST	TOTAL ANNUAL DELAY COST	TOTAL ANNUAL DELAY REDUCED
FISH RIVER: 4.0' MLW											
5'DRAFT FULLY LOADED	4.0'	21.34	15.299	63	9.64	6.0	57.83	39	\$10.47	\$23,600	\$129,100
4'DRAFT FULLY LOADED	4.0'	24.93	1.070	72	0.77	6.0	4.62	31	\$6.42	\$900	\$58,000
3'DRAFT FULLY LOADED	4.0'	25.20	0.008	94	0.01	6.0	0.04	19	\$5.51	\$0	\$3,900
MAGNOLIA RIVER: 4.0' MLW											
5'DRAFT FULLY LOADED	4.0'	21.34	15.299	63	9.64	6.0	57.83	0	\$10.47	\$0	\$0
4'DRAFT FULLY LOADED	4.0'	24.93	1.070	72	0.77	6.0	4.62	6	\$6.42	\$200	\$11,200
3'DRAFT FULLY LOADED	4.0'	25.20	0.008	94	0.01	6.0	0.04	6	\$5.51	\$0	\$1,200
TOTAL								101		\$24,700	\$203,400

- 1/: CHANNEL DEPTH IS 4.0' MLW AT CONSTRAINT.
2/: PERCENT OF TIME NOT EXCEEDED (1975-1987 HIGH DURATION) MULTIPLIED BY 25.2 HOURS.
3/: TIDAL GAUGE DATA FOR PERIOD OF RECORD (1963 THRU 1987).
4/: DRAFT REPORT ON COMMERCIAL FISHING COST RETURN PROFILES FOR GULF COAST AREA, CENTAUR ASSOCIATES 1975
5/: PROBABILITY OF DELAY MULTIPLIED BY THE NUMBER OF TRIPS PER YEAR.
(PROBABILITY OF DELAY = % OF TIME W/O ADEQUATE DEPTH.)
6/: IN FIELD INTERVIEWS IT WAS DETERMINED THAT THE AVERAGE DELAY PER TRIP DELAYED WAS SIX HOURS AWAITING ADEQUATE DEPTH.
7/: NO OF TRIPS DELAYED MULTIPLIED BY AVERAGE ANNUAL DELAY.
8/: TABLE 5, ANNUAL VARIABLE COSTS (INCLUDING CAPTAINS WAGES) WERE DIVIDED BY THE ANNUAL HOURS FISHING.
HOURS WORKED PER TRIP WERE ESTIMATED TO BE THE DAYS FISHED MULTIPLIED BY 24 HRS.

TABLE 14
WITH-PROJECT CONDITIONS DREDGED TO 5.0 FEET MEAN LOW WATER
AVERAGE ANNUAL VESSEL COSTS BY DRAFT DUE TO DELAYS

WITH PROJECT CONDITIONS HARBOR/VESSEL/DRAFT	1/ CHANNEL DEPTH	2/ HOURS AT DEPTH	3/ % TIME W/OUT ADEQ. DEPTH	4/ NO OF YR TRIPS	5/ NO ANNUAL TRIPS DELAYED	6/ AVG HRS DELAYED ON TRIP DELAYED	7/ TOTAL HRS VSL DELAY	8/ NO OF VESSELS	VARIABLE OPER COST	TOTAL ANNUAL DELAY COST	TOTAL ANNUAL DELAY REDUCED
FISH RIVER: 5.0' MLW											
5'DRAFT FULLY LOADED	5.0'	24.93	1.070	63	0.67	6.0	4.04	39	\$10.47	\$1,700	\$151,000
4'DRAFT FULLY LOADED	5.0'	25.20	0.008	72	0.01	6.0	0.03	31	\$6.42	\$0	\$58,900
3'DRAFT FULLY LOADED	5.0'	25.20	0.000	94	0.00	6.0	0.00	19	\$5.51	\$0	\$3,900
MAGNOLIA RIVER: 5.0' MLW											
5'DRAFT FULLY LOADED	5.0'	24.93	1.070	63	0.67	6.0	4.04	0	\$10.47	\$0	\$0
4'DRAFT FULLY LOADED	5.0'	25.20	0.008	72	0.01	6.0	0.03	6	\$6.42	\$0	\$11,400
3'DRAFT FULLY LOADED	5.0'	25.20	0.000	94	0.00	6.0	0.00	6	\$5.51	\$0	\$1,200
TOTAL								101		\$1,700	\$226,400

1/: CHANNEL DEPTH IS 5.0' MLW AT CONSTRAINT.

2/: PERCENT OF TIME NOT EXCEEDED (1975-1987 HIGH EUPATION) MULTIPLIED BY 25.2 HOURS.

3/: TIDAL GAUGE DATA FOR PERIOD OF RECORD (1966 THRU 1987).

4/: DRAFT REPORT ON COMMERCIAL FISHING COST RETURN PROFILES FOR GULF COAST AREA, CENTAUR ASSOCIATES 1975

5/: PROBABILITY OF DELAY MULTIPLIED BY THE NUMBER OF TRIPS PER YEAR.

(PROBABILITY OF DELAY = % OF TIME W/O ADEQUATE DEPTH.)

6/: IN FIELD INTERVIEWS IT WAS DETERMINED THAT THE AVERAGE DELAY PER TRIP DELAYED WAS SIX HOURS AWAITING ADEQUATE DEPTH.

7/: NO OF TRIPS DELAYED MULTIPLIED BY AVERAGE ANNUAL DELAY.

8/: TABLE 5, ANNUAL VARIABLE COSTS (INCLUDING CAPTAINS WAGES) WERE DIVIDED BY THE ANNUAL HOURS FISHING.

HOURS WORKED PER TRIP WERE ESTIMATED TO BE THE DAYS FISHED MULTIPLIED BY 24 HRS.

TABLE 15
WITH-PROJECT CONDITIONS DREDGED TO 6.0 FEET MEAN LOW WATER
AVERAGE ANNUAL VESSEL COSTS BY DRAFT DUE TO DELAYS

WITH PROJECT CONDITIONS HARBOR/VESSEL/DRAFT	1/ CHANNEL DEPTH	2/ HOURS AT DEPTH	3/ % TIME W/O ADEQ. DEPTH	4/ NO OF YR TRIPS	5/ NO ANNUAL TRIPS DELAYED	6/ AVG HRS DELAYED ON TRIP DELAYED	7/ TOTAL HRS VSL DELAY	8/ NO OF VESSELS	9/ VARIABLE OPER COST	10/ TOTAL ANNUAL DELAY COST	11/ TOTAL ANNUAL DELAY REDUCED
FISH RIVER: 5.0' MLW											
5'DRAFT FULLY LOADED	6.0'	25.20	0.008	63	0.00	6.0	0.03	39	\$10.47	\$0	\$152,700
4'DRAFT FULLY LOADED	6.0'	25.20	0.000	72	0.00	6.0	0.00	31	\$6.42	\$0	\$58,900
3'DRAFT FULLY LOADED	6.0'	25.20	0.000	94	0.00	6.0	0.00	19	\$5.51	\$0	\$3,900
MAGNOLIA RIVER: 5.0' MLW											
5'DRAFT FULLY LOADED	6.0'	25.20	0.008	63	0.00	6.0	0.03	0	\$10.47	\$0	\$0
4'DRAFT FULLY LOADED	6.0'	25.20	0.000	72	0.00	6.0	0.00	6	\$6.42	\$0	\$11,400
3'DRAFT FULLY LOADED	6.0'	25.20	0.000	94	0.00	6.0	0.00	6	\$5.51	\$0	\$1,200
TOTAL								101		\$0	\$228,100

- 1/: CHANNEL DEPTH IS 5.0' MLW AT CONSTRAINT.
2/: PERCENT OF TIME NOT EXCEEDED (1975-1987 HIGH DURATION) MULTIPLIED BY 15.2 HOURS.
3/: TIDAL GAUGE DATA FOR PERIOD OF RECORD (1963 THRU 1987).
4/: DRAFT REPORT ON COMMERCIAL FISHING COST RETURN PROFILES FOR GULF COAST AREA, CENTAUR ASSOCIATES 1975
5/: PROBABILITY OF DELAY MULTIPLIED BY THE NUMBER OF TRIPS PER YEAR.
(PROBABILITY OF DELAY = % OF TIME W/O ADEQUATE DEPTH.)
6/: IN FIELD INTERVIEWS IT WAS DETERMINED THAT THE AVERAGE DELAY PER TRIP DELAYED WAS SIX HOURS AWAITING ADEQUATE DEPTH.
7/: NO OF TRIPS DELAYED MULTIPLIED BY AVERAGE ANNUAL DELAY.
8/: TABLE 5, ANNUAL VARIABLE COSTS (INCLUDING CAPTAINS WAGES) WERE DIVIDED BY THE ANNUAL HOURS FISHING.
HOURS WORKED PER TRIP WERE ESTIMATED TO BE THE DAYS FISHED MULTIPLIED BY 24 HRS.

TABLE 16
AVERAGE ANNUAL RECREATIONAL VESSEL DELAYS BY DRAFT
WITH-PROJECT CONDITION: CHANNEL DEPTH = 3.0' MLD

HARBOR/VESSEL/DRAFT	1/ ANNUAL VALUE OF LOST BOATING OPPORTUNITIES	2/ NUMBER OF VESSELS VISITORS PER VESSEL	3/ PERCENT OF TIME W/O ADEQUATE DEPTH	TOTAL ANNUAL RECREATIONAL VALUE	TOTAL ANNUAL DELAYS	TOTAL ANNUAL DELAY REDUCED
FISH RIVER						
5.0' DRAFT FULLY LOADED	\$42	30	5.5	\$6,900	\$5,400	\$1,400
4.0' DRAFT FULLY LOADED	\$42	40	3.5	\$5,900	\$900	\$3,100
3.0' DRAFT FULLY LOADED	\$42	35	2.5	\$3,700	\$0	\$200
SUBTOTAL				\$16,500	\$6,300	\$4,700
MAGNOLIA RIVER						
5.0' DRAFT FULLY LOADED	\$42	10	5.5	\$2,300	\$1,800	\$500
4.0' DRAFT FULLY LOADED	\$42	30	3.5	\$4,400	\$700	\$2,300
3.0' DRAFT FULLY LOADED	\$42	10	2.5	\$1,100	\$0	\$100
SUBTOTAL				\$7,800	\$2,500	\$2,900
WEEKS BAY TOTAL				\$24,300	\$8,800	\$7,600

1/: UNIT DAY VALUE OF A TRIP TO WEEKS BAY TIMES THE NUMBER OF ANNUAL TRIPS

2/: *BUREAU OF OUTDOOR RECREATION STANDARDS BOOK*; OUTDOOR RECREATION SPACE STANDARDS FOR ALL TYPES OF ACTIVITIES, APRIL 1967.

3/: FROM TABLE 14 COLUMN 3

TABLE 17
AVERAGE ANNUAL RECREATIONAL VESSEL DELAYS BY DRAFT
WITH PROJECT CONDITIONS: CHANNEL DEPTH = 4.0' MLW

HARBOR/VESSEL/DRAFT	1/ ANNUAL VALUE OF LOST BOATING OPPORTUNITIES	NUMBER OF VESSELS	2/ NUMBER OF VISITORS PER VESSEL	TOTAL ANNUAL RECREATIONAL VALUE	3/ PERCENT OF TIME W/O ADEQUATE DEPTH	TOTAL ANNUAL DELAYS	TOTAL ANNUAL DELAY REDUCED
FISH RIVER							
5.0' DRAFT FULLY LOADED	\$42	30	5.5	\$6,900	15.299	\$1,100	\$5,700
4.0' DRAFT FULLY LOADED	\$42	40	3.5	\$5,900	1.07	\$100	\$3,900
3.0' DRAFT FULLY LOADED	\$42	35	2.5	\$3,700	0.008	\$0	\$200
SUBTOTAL				\$16,500		\$1,200	\$9,800
MAGNOLIA RIVER							
5.0' DRAFT FULLY LOADED	\$42	10	5.5	\$2,300	15.299	\$400	\$1,900
4.0' DRAFT FULLY LOADED	\$42	30	3.5	\$4,400	1.07	\$0	\$3,000
3.0' DRAFT FULLY LOADED	\$42	10	2.5	\$1,100	0.008	\$0	\$100
SUBTOTAL				\$7,800		\$400	\$5,000
WEE'S BAY 106' MLW				\$24,300		\$1,600	\$14,800

1/: UNIT DAY VALUE OF A TRIP TO WEE'S BAY TIMES THE NUMBER OF ANNUAL TRIPS

2/: "BUREAU OF OUTDOOR RECREATION STANDARDS BOOK"; OUTDOOR RECREATION SPACE
STANDARDS FOR ALL TYPES OF ACTIVITIES, APRIL 1967.

3/: FROM TABLE 14 COLUMN 3

TABLE 18
AVERAGE ANNUAL RECREATIONAL VESSEL DELAYS BY DRAFT
WITH PROJECT CONDITIONS: CHANNEL DEPTH = 5.0' MLW

HARBOR/VESSEL/DRAFT	1/ ANNUAL VALUE OF LOST BOATING OPPORTUNITIES	NUMBER OF VESSELS	2/ NUMBER OF VISITORS PER VESSEL	TOTAL ANNUAL RECREATIONAL VALUE	3/ PERCENT OF TIME W/O ADEQUATE DEPTH	TOTAL ANNUAL DELAYS	TOTAL ANNUAL DELAY REDUCED
FISH RIVER							
5.0' DRAFT FULLY LOADED	\$42	30	5.5	\$6,900	1.07	\$100	\$6,700
4.0' DRAFT FULLY LOADED	\$42	40	3.5	\$5,900	0.008	\$0	\$4,000
3.0' DRAFT FULLY LOADED	\$42	35	2.5	\$3,700	0	\$0	\$200
SUBTOTAL				\$16,500		\$100	\$10,900
MAGNOLIA RIVER							
5.0' DRAFT FULLY LOADED	\$42	10	5.5	\$2,300	1.07	\$0	\$2,300
4.0' DRAFT FULLY LOADED	\$42	30	3.5	\$4,400	0.008	\$0	\$3,000
3.0' DRAFT FULLY LOADED	\$42	10	2.5	\$1,100	0	\$0	\$100
SUL				\$7,800		\$0	\$5,400
WHEELS BAY TOTAL				\$24,300		\$100	\$16,300

1/: UNIT DAY VALUE OF A TRIP TO WEEKS BAY TIMES THE NUMBER OF ANNUAL TRIPS

2/: "BUREAU OF OUTDOOR RECREATION STANDARDS BOOK"; OUTDOOR RECREATION SPACE
STANDARDS FOR ALL TYPES OF ACTIVITIES, APRIL 1967.

3/: FROM TABLE 14 COLUMN 3

TABLE 19
AVERAGE ANNUAL RECREATIONAL VESSEL DELAYS BY DRAFT
WITH PROJECT CONDITIONS: CHANNEL DEPTH = 6.0' MLW

HARBOR/VESSEL/DRAFT	1/ ANNUAL VALUE OF LOST BOATING OPPORTUNITIES	NUMBER OF VESSELS	2/ NUMBER OF VISITORS PER VESSEL	TOTAL ANNUAL RECREATIONAL VALUE	3/ PERCENT OF TIME W/O ADEQUATE DEPTH	TOTAL ANNUAL DELAYS	TOTAL ANNUAL DELAY REDUCED
FISH RIVER							
5.0' DRAFT FULLY LOADED	\$42	30	5.5	\$6,900	0.008	\$0	\$6,800
4.0' DRAFT FULLY LOADED	\$42	40	3.5	\$5,900	0	\$0	\$4,000
3.0' DRAFT FULLY LOADED	\$42	35	2.5	\$3,700	0	\$0	\$200
SUBTOTAL				\$16,500		\$0	\$11,000
MAGNOLIA RIVER							
5.0' DRAFT FULLY LOADED	\$42	10	5.5	\$2,300	0.008	\$0	\$2,300
4.0' DRAFT FULLY LOADED	\$42	30	3.5	\$4,400	0	\$0	\$3,000
3.0' DRAFT FULLY LOADED	\$42	10	2.5	\$1,100	0	\$0	\$100
SUBTOTAL				\$7,800		\$0	\$5,400
WEEKS BAY TOTAL				\$24,300		\$0	\$16,400

- 1/: UNIT DAY VALUE OF A TRIP TO WEEKS BAY TIMES THE NUMBER OF ANNUAL TRIPS
2/: "BUREAU OF OUTDOOR RECREATION STANDARDS BOOK"; OUTDOOR RECREATION SPACE
STANDARDS FOR ALL TYPES OF ACTIVITIES, APRIL 1967.
3/: FROM TABLE 14 COLUMN 3

TABLE 20
VESSEL INCOME DATA BY DRAFT

CATEGORIES		2.6' TO 3.5' SHRIMP	3.6' TO 5.0' SHRIMP	5.0' + SHRIMP
WITHOUT PROJECT CATEGORIES				
ANNUAL REVENUE	(1)	\$25,910	\$31,398	\$40,401
FIXED COSTS	(1)	\$5,537	\$6,304	\$7,371
VARIABLE COSTS	(1)	\$12,249	\$19,426	\$24,591
WAGES AND PROFITS	(2)	\$8,124	\$5,068	\$7,839
CAPTAIN'S WAGE LESS DEPR	(1)	\$8,124	\$5,068	\$7,839
VAR OPER COST/CAPT WAGE	(1)	\$5.51	\$6.42	\$10.47
0 ANNUAL TRIPS FISHING	(1)	34	72	63
0 ANNUAL DAYS FISHING	(1)	154	159	129
REVENUE PER DAY	(3)	\$168	\$197	\$313
WITH PROJECT CATEGORIES				
FISH RIVER				
REVENUE PER DAY	(4)	\$168	\$211	\$448
ANNUAL REVENUE	(5)	\$25,910	\$34,426	\$57,745
FIXED COSTS	(1)	\$5,537	\$6,304	\$7,971
VARIABLE COSTS	(6)	\$12,249	\$21,305	\$35,148
WAGES AND PROFITS	(7)	\$8,124	\$6,226	\$14,626
MAGNOLIA RIVER				
REVENUE PER DAY	(4)	\$168	\$211	\$448
ANNUAL REVENUE	(5)	\$25,910	\$34,426	\$57,745
FIXED COSTS	(1)	\$5,537	\$6,304	\$7,971
VARIABLE COSTS	(6)	\$12,249	\$21,305	\$35,148
WAGES AND PROFITS	(7)	\$8,124	\$6,226	\$14,626

- (1) DRAFT REPORT ON COMMERCIAL FISHING COST RETURN PROFILES FOR GULF COAST AREAS, JAN, 1985 PP2-48 TO 2-25 AND 2-27 TO 2-28
- (2) IBID. CAPTAIN /OWNER RETURN WITH DEPRECIATION EQUALS REVENUE MINUS FIXED AND VARIABLE COSTS
- (3) ANNUAL REVENUE DIVIDED BY ANNUAL DAYS FISHING
- (4) PERCENT CHANGE IN TABLE 3 TRIPS DELAYED IN COLUMNS 4 AND 3 MULTIPLIED BY .5 TIMES THE DIFFERENCE IN AVERAGE AND MAXIMUM REVENUES OF VESSELS BY DRAFT PLUS W/O REVENUE PER DAY
- (5) REVENUE PER DAY X NO. OF DAYS FISHING
- (6) PERCENT CHANGE IN WITH TO WITHOUT PROJECT ANNUAL REVENUE X WITHOUT PROJ. VAR. COSTS
- (7) WITH PROJ. ANNUAL REVENUE MINUS FIXED AND VAR. COSTS

TABLE 21
SUMMARY OF WITHOUT-PROJECT
CONDITION COSTS

CATEGORY BY VESSEL TYPE	MAGNOLIA	FISH	TOTAL
DAMAGE REDUCTION			
COMMERCIAL VESSELS	\$3,900	\$36,600	\$40,500
RECREATIONAL VESSELS	\$0	\$0	\$0
DELAY COST REDUCTION			
COMMERCIAL VESSELS	\$12,600	\$215,500	\$228,100
RECREATIONAL VESSELS	\$5,400	\$11,000	\$16,400
BENEFIT SUMMATION			
COMMERCIAL VESSELS	\$16,500	\$252,100	\$268,600
RECREATIONAL VESSELS	\$5,400	\$11,000	\$16,400
TOTALS	\$21,900	\$273,100	\$285,000

- TABLE 22
SUMMARY OF WITH-PROJECT BENEFITS

W/O PROJ. : COSTS :		COST REMAINING				WITH-PROJECT BENEFITS			
		3'	4'	5'	6'	3'	4'	5'	6'
MAGNOLIA RIVER CATEGORIES:									
DAMAGE REDUCTION									
COMMERCIAL VESSELS	\$3,900	\$3,900	\$2,300	\$0	\$0	\$0	\$1,600	\$3,900	\$3,900
RECREATIONAL VESSELS	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DELAY COST REDUCTION									
COMMERCIAL VESSELS	\$12,600	\$2,700	\$200	\$0	\$0	\$9,900	\$12,400	\$12,600	\$12,600
RECREATIONAL VESSELS	\$5,400	\$2,500	\$400	\$0	\$0	\$2,900	\$5,000	\$5,400	\$5,400
SUBTOTALS									
COMMERCIAL VESSELS	\$16,500	\$6,600	\$2,500	\$0	\$0	\$9,900	\$14,000	\$16,500	\$16,500
RECREATIONAL VESSELS	\$5,400	\$2,500	\$400	\$0	\$0	\$2,900	\$5,000	\$5,400	\$5,400
MAGNOLIA RIVER SUBTOTAL		\$21,900	\$18,200	\$2,900	\$0	\$12,800	\$19,000	\$21,900	\$21,900
FISH RIVER CATEGORIES									
DAMAGE REDUCTION									
COMMERCIAL VESSELS	\$36,600	\$36,600	\$31,700	\$19,800	\$0	\$0	\$4,900	\$16,800	\$36,600
RECREATIONAL VESSELS	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DELAY COST REDUCTION									
COMMERCIAL VESSELS	\$215,500	\$133,500	\$12,100	\$1,700	\$0	\$82,000	\$203,400	\$213,800	\$215,500
RECREATIONAL VESSELS	\$11,000	\$6,300	\$1,200	\$100	\$0	\$4,700	\$9,800	\$10,300	\$11,000
SUBTOTALS									
COMMERCIAL VESSELS	\$252,100	\$170,100	\$43,800	\$21,500	\$0	\$82,000	\$208,300	\$230,600	\$252,100
RECREATIONAL VESSELS	\$11,000	\$6,300	\$1,200	\$100	\$0	\$4,700	\$9,800	\$10,300	\$11,000
FISH RIVER SUBTOTAL		\$263,100	\$176,400	\$45,000	\$21,600	\$86,700	\$218,100	\$241,500	\$263,100
TOTALS		\$285,000	\$194,600	\$47,900	\$21,600	\$99,500	\$237,100	\$263,400	\$285,000

TABLE 23
COST OF COMMUTING TO BON SECOUR

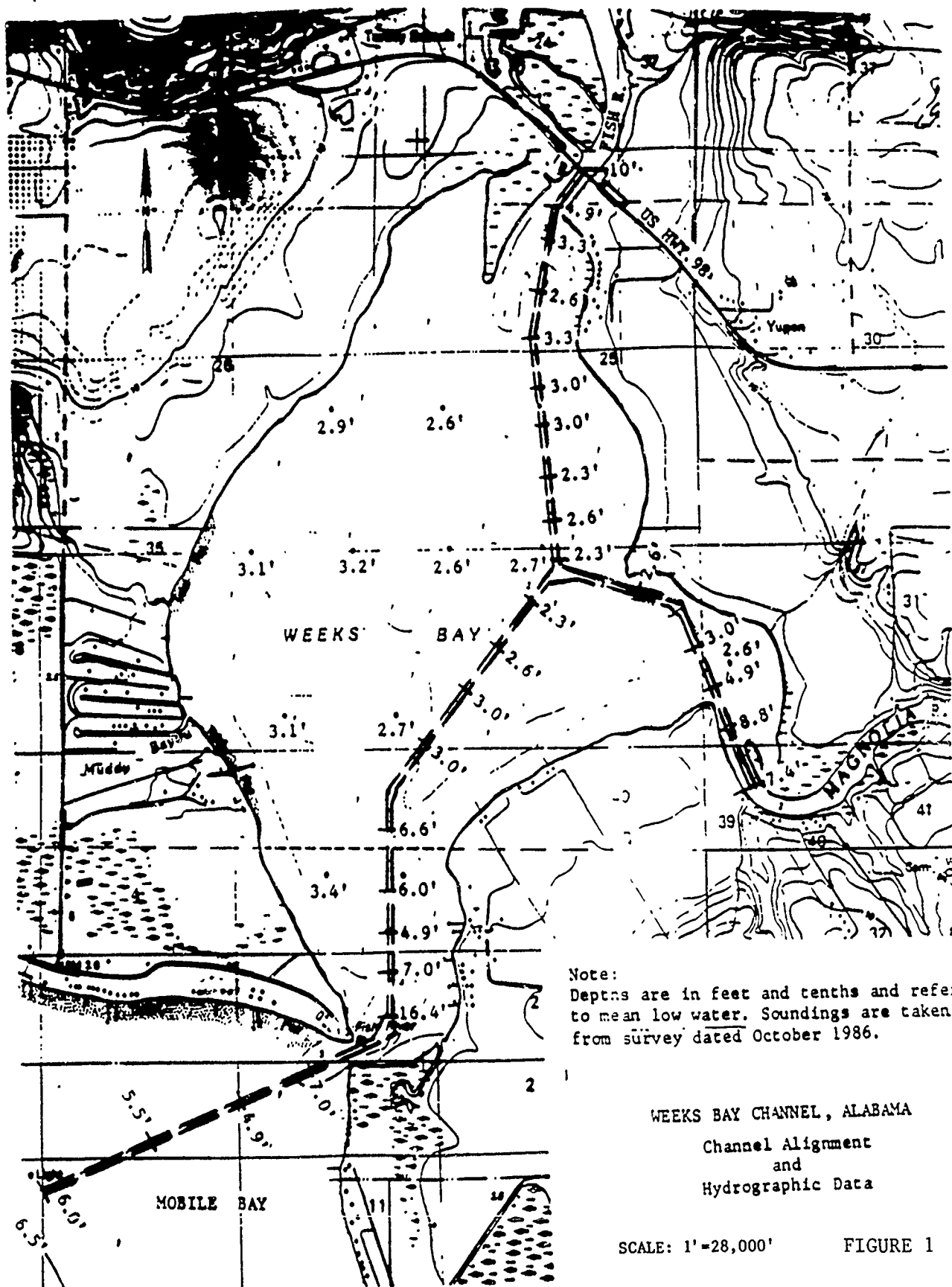
SEGMENT AND VESSEL DRAFT	1/ NUMBER OF VESSELS	2/ ANNUAL TRIPS FISHING	3/ ROUND TRIP MILEAGE	4/ OPERATING COST/MILE	TOTAL COST PER YEAR
FISH RIVER					
5' DRAFT	39	94	26	\$0.145	\$13,800
4' DRAFT	31	72	26	\$0.145	\$8,400
3' DRAFT	19	63	26	\$0.145	\$4,500
SUBTOTAL					\$26,700
MAGNOLIA RIVER					
5' DRAFT	0	94	20	\$0.145	\$0
4' DRAFT	6	72	20	\$0.145	\$1,300
3' DRAFT	6	63	20	\$0.145	\$1,100
SUBTOTAL					\$2,400
ANNUAL COST OF COMMUTING:					\$29,100

1/: PAGE 3

2/: CENTAUR ASSOCIATES "DRAFT REPORT ON COMMERCIAL FISHING COST RETURN
PROFILES FOR GULF COAST AREAS."

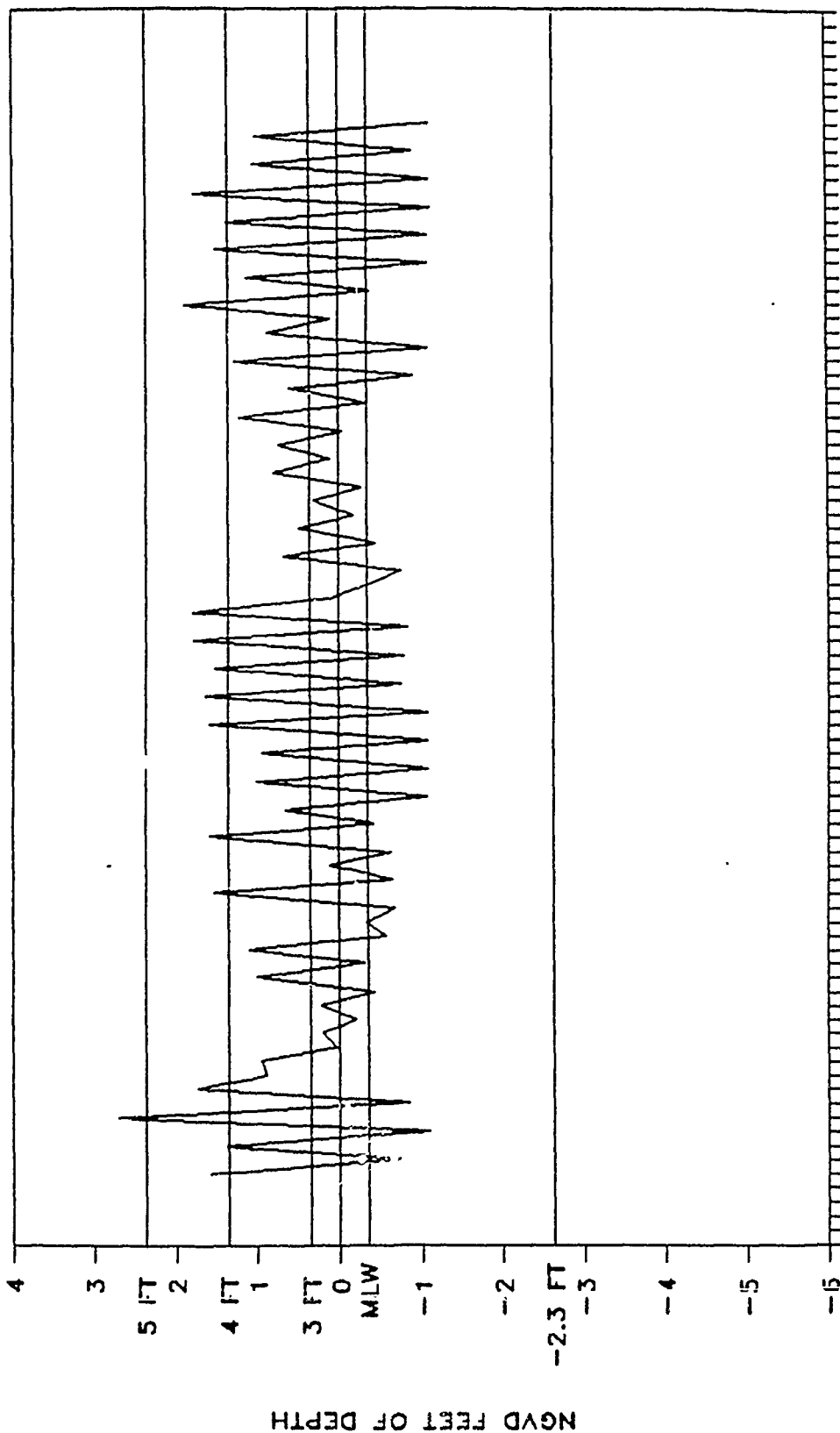
3/: ROUND TRIP MILES BETWEEN FISH AND MAGNOLIA RIVERS AND BON SECOUR

4/: "COST OF OPERATING AUTOMOBILES AND VANS, 1987," U.S. DEPT. OF TRANSPORTATION.



WEEKS BAY TIDES: JAN. 1987

NGVD = 0.0'; MEAN LOW WATER = -.34 NGVD

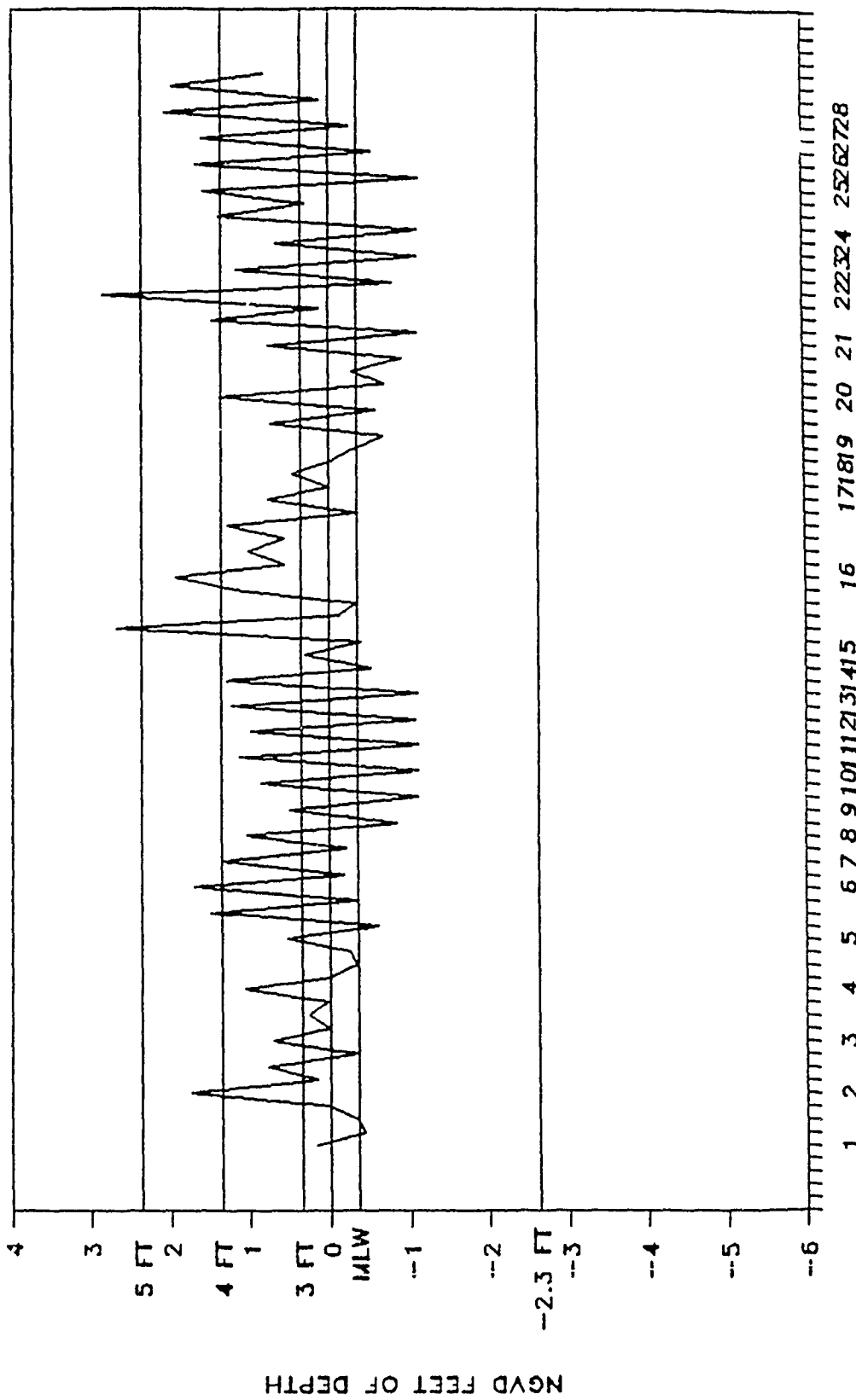


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

DATE OF TIDE

WEEKS BAY TIDES: FEB. 1987

NGVD = 0.0'; MEAN LOW WATER = -0.34 NGVD

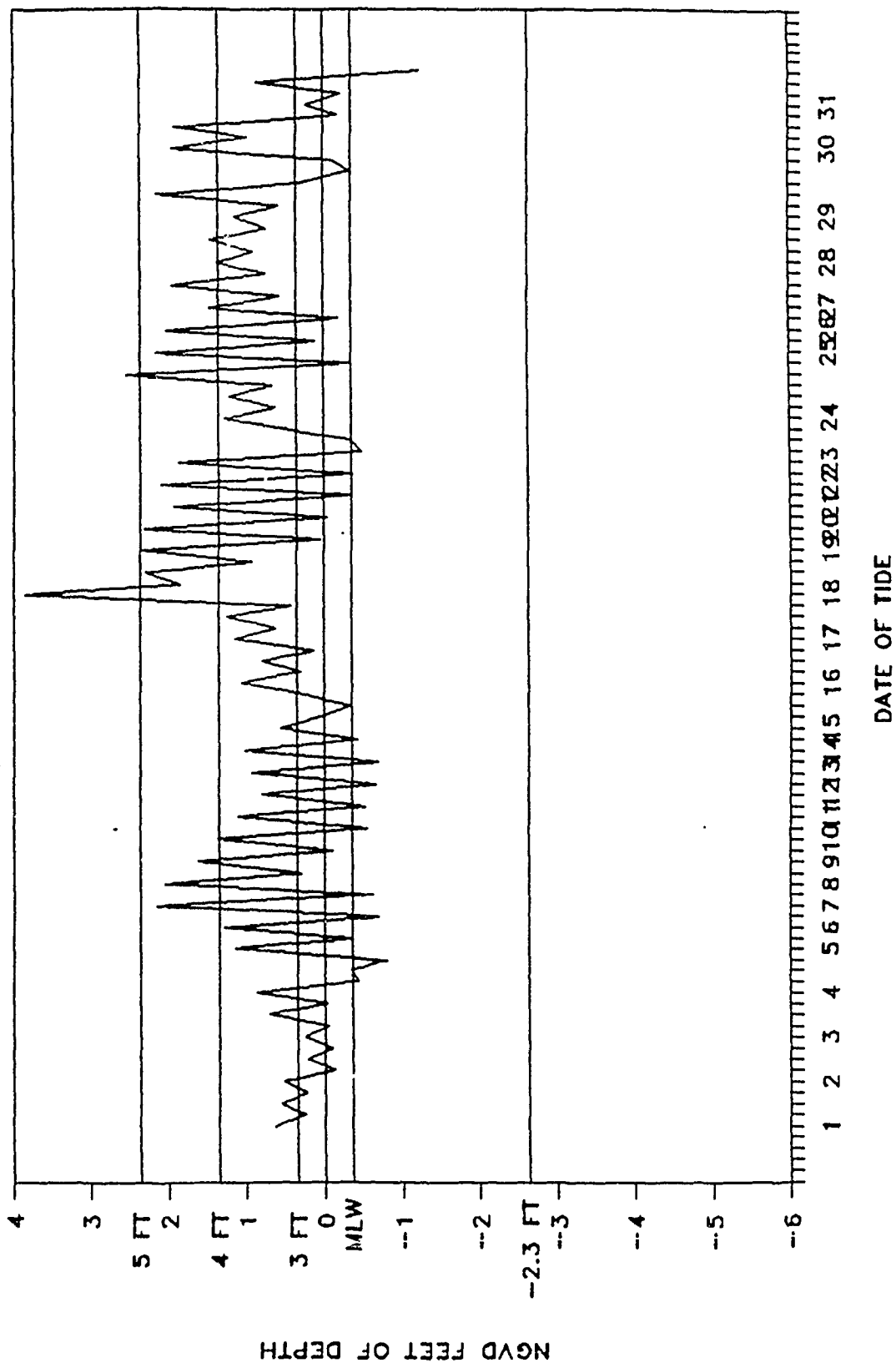


B-37

FIGURE 3

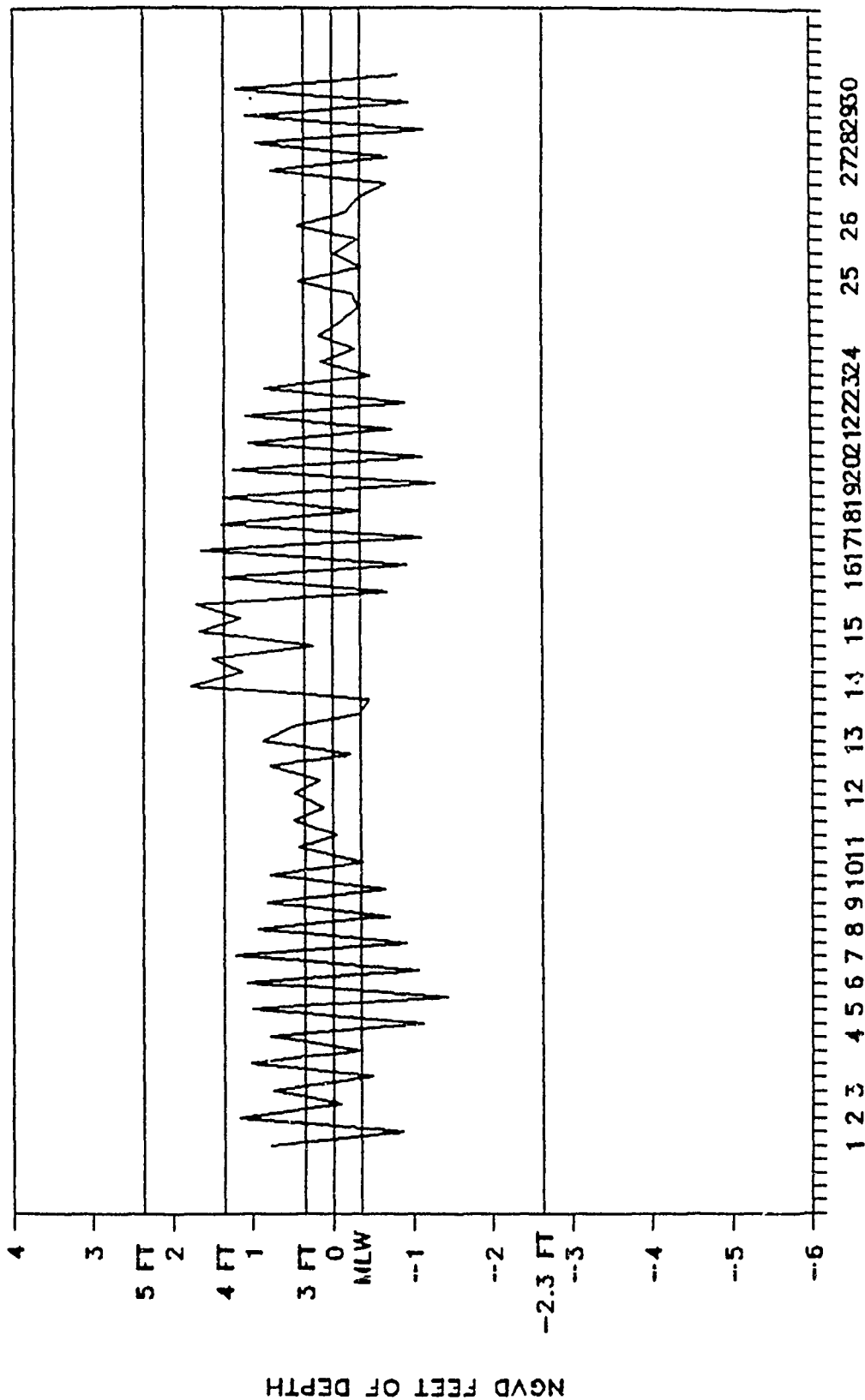
WEEKS BAY TIDES: MAR. 1987

NGVD = 0.0'; MEAN LOW WATER = -0.34 NGVD



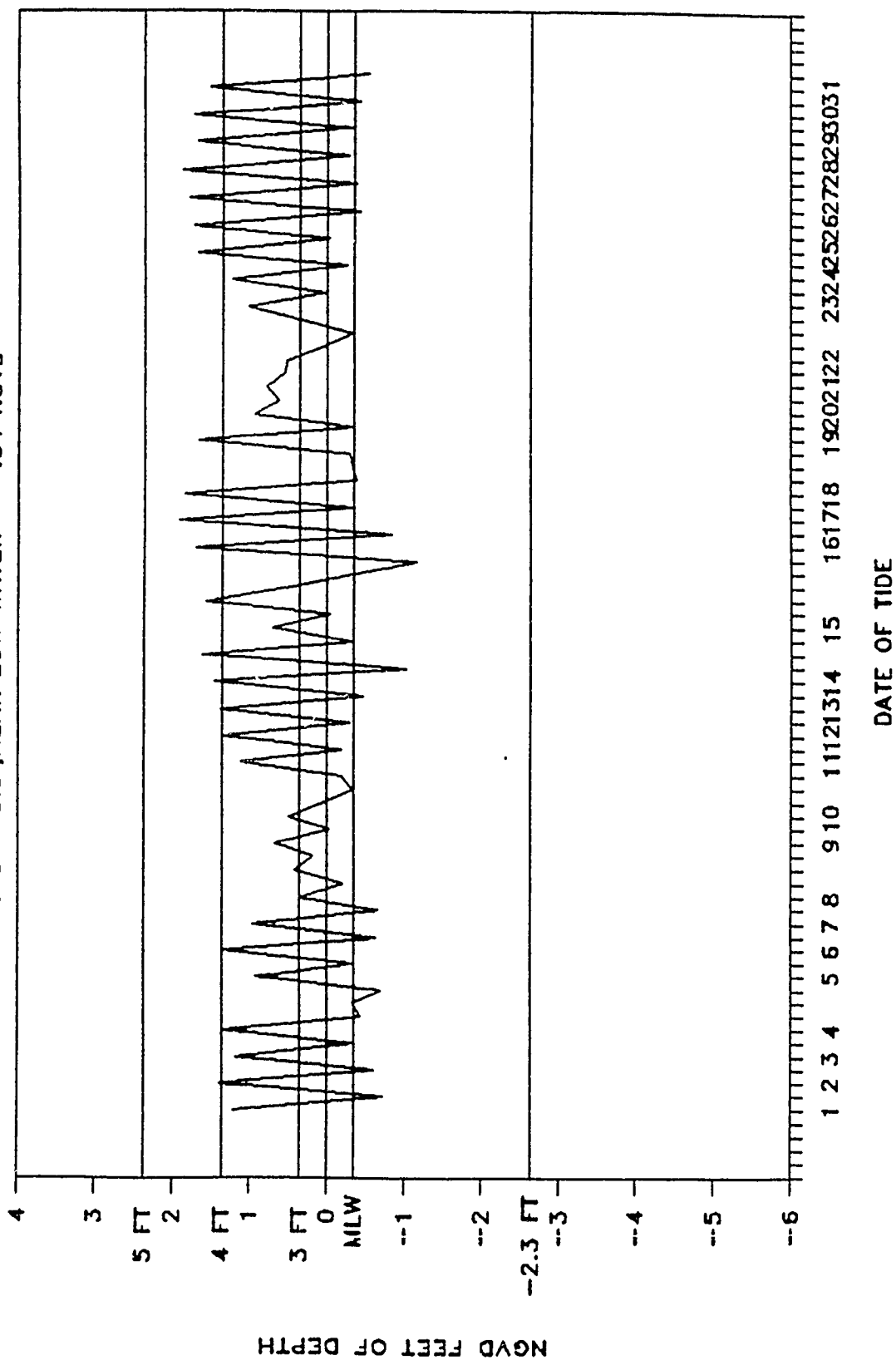
WEEKS BAY TIDES: APR. 1987

NGVD = 0.0'; MEAN LOW WATER = -.34 NGVD



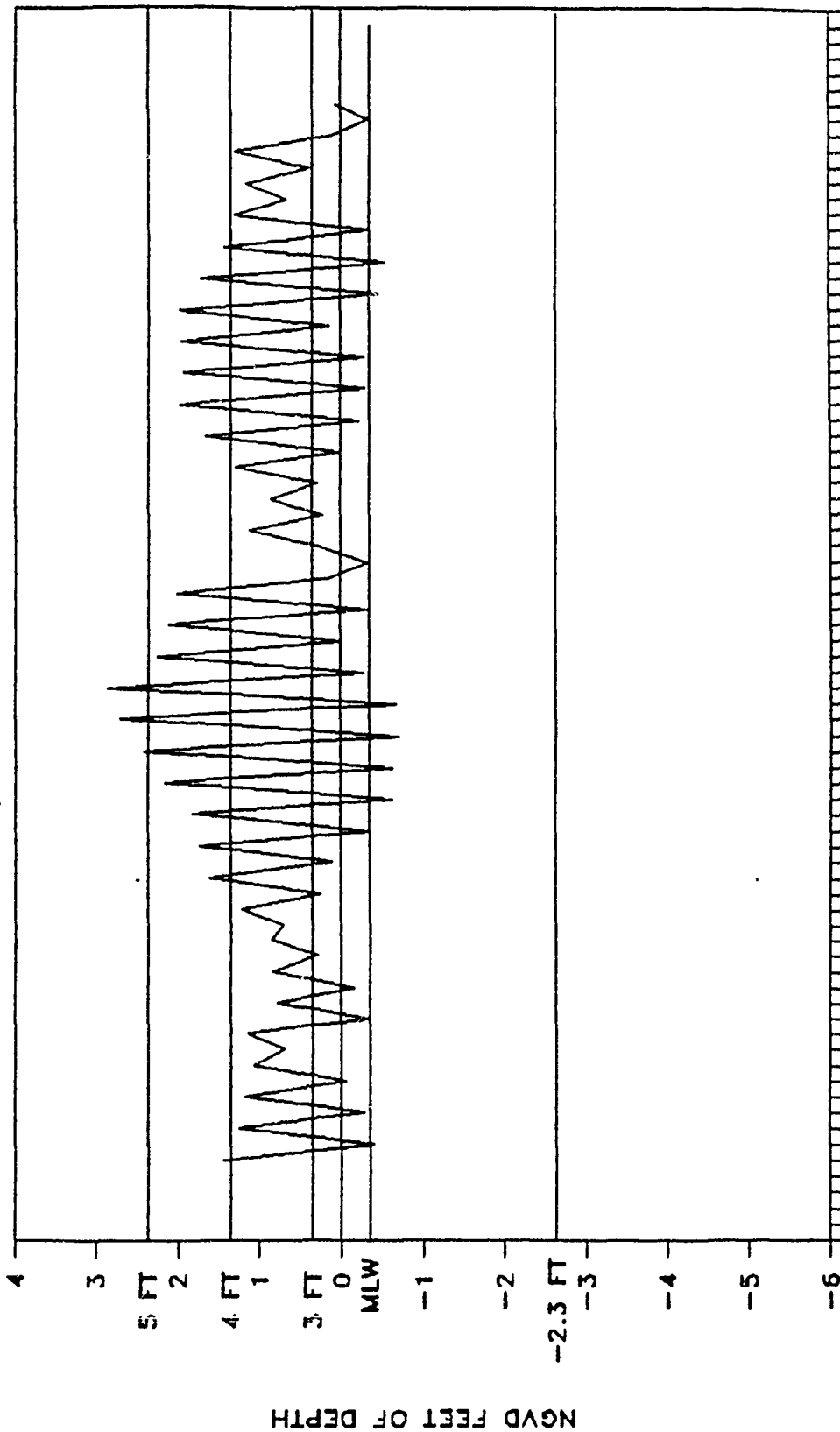
WEEKS BAY TIDES: MAY 1987

NGVD = 0.0'; MEAN LOW WATER = -.34 NGVD



WEEKS BAY TIDES JUNE 1987

NGVD = 0.0'; MEAN LOW WATER = -0.34 NGVD

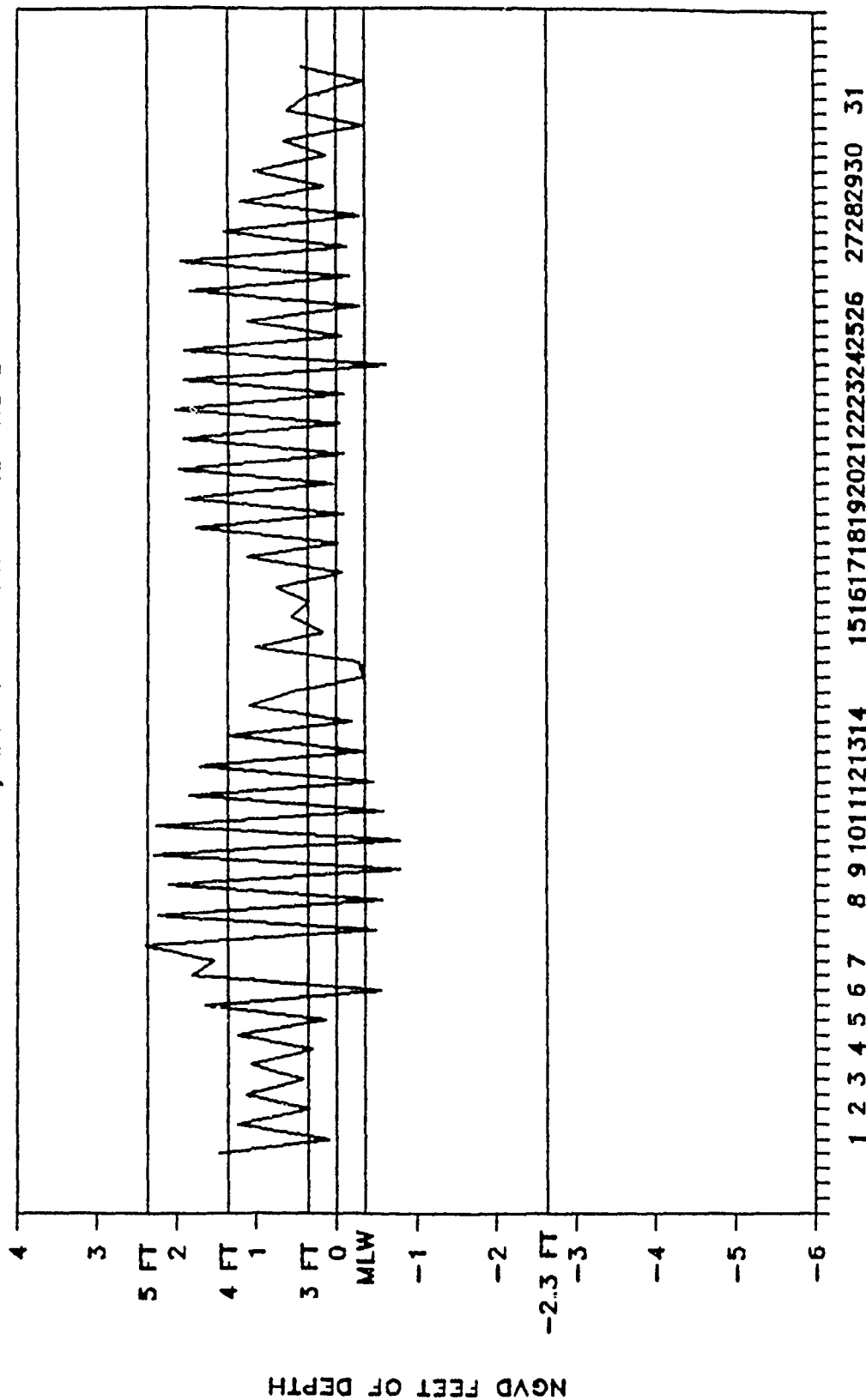


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

DATE OF TIDE

WEEKS BAY TIDES: JULY 1987

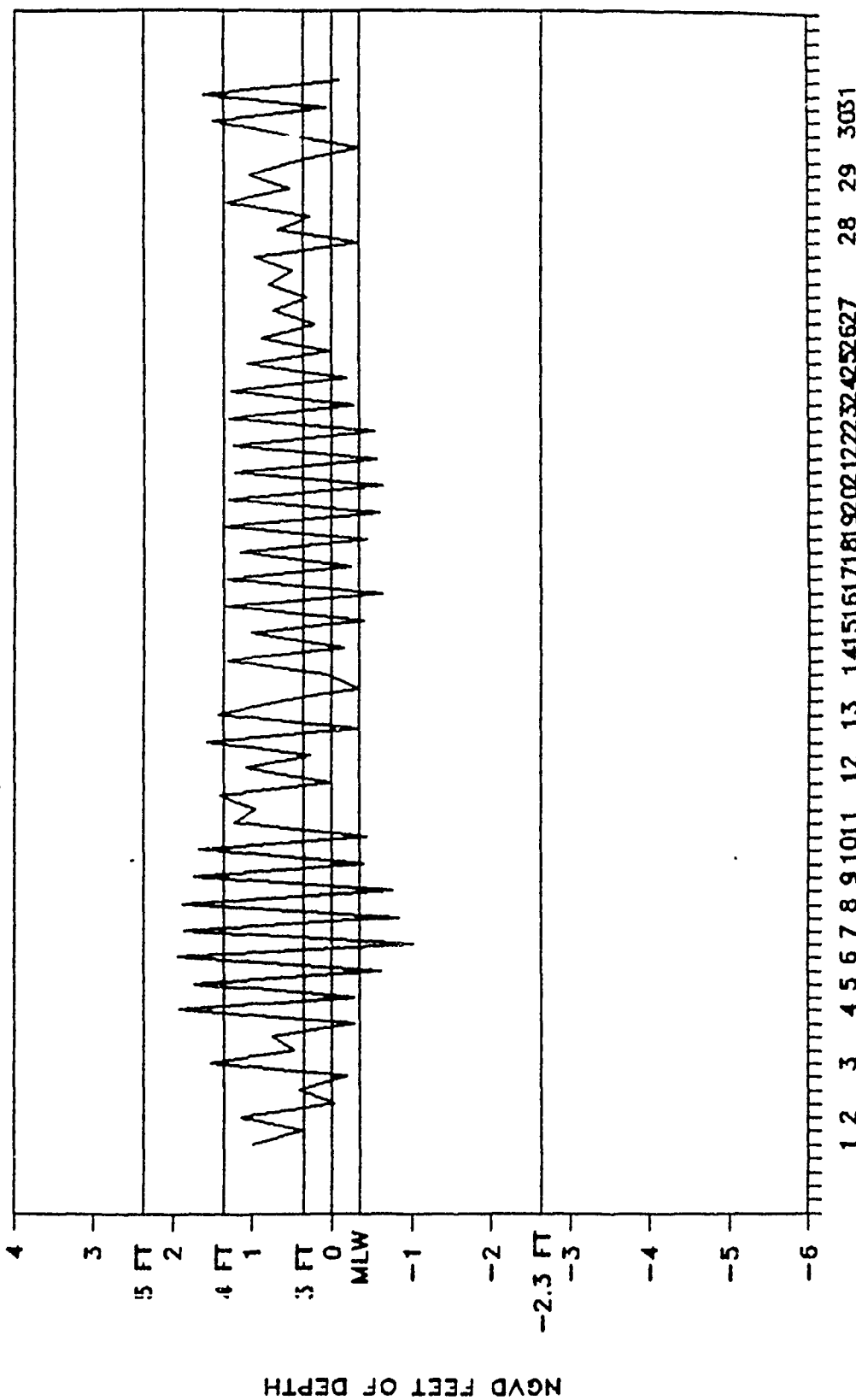
NGVD = 0.0'; MEAN LOW WATER = -0.34 NGVD



DATE OF TIDE

WEEKS BAY TIDES: AUG. 1987

NGVD = 0.0'; MEAN LOW WATER = -.34 NGVD

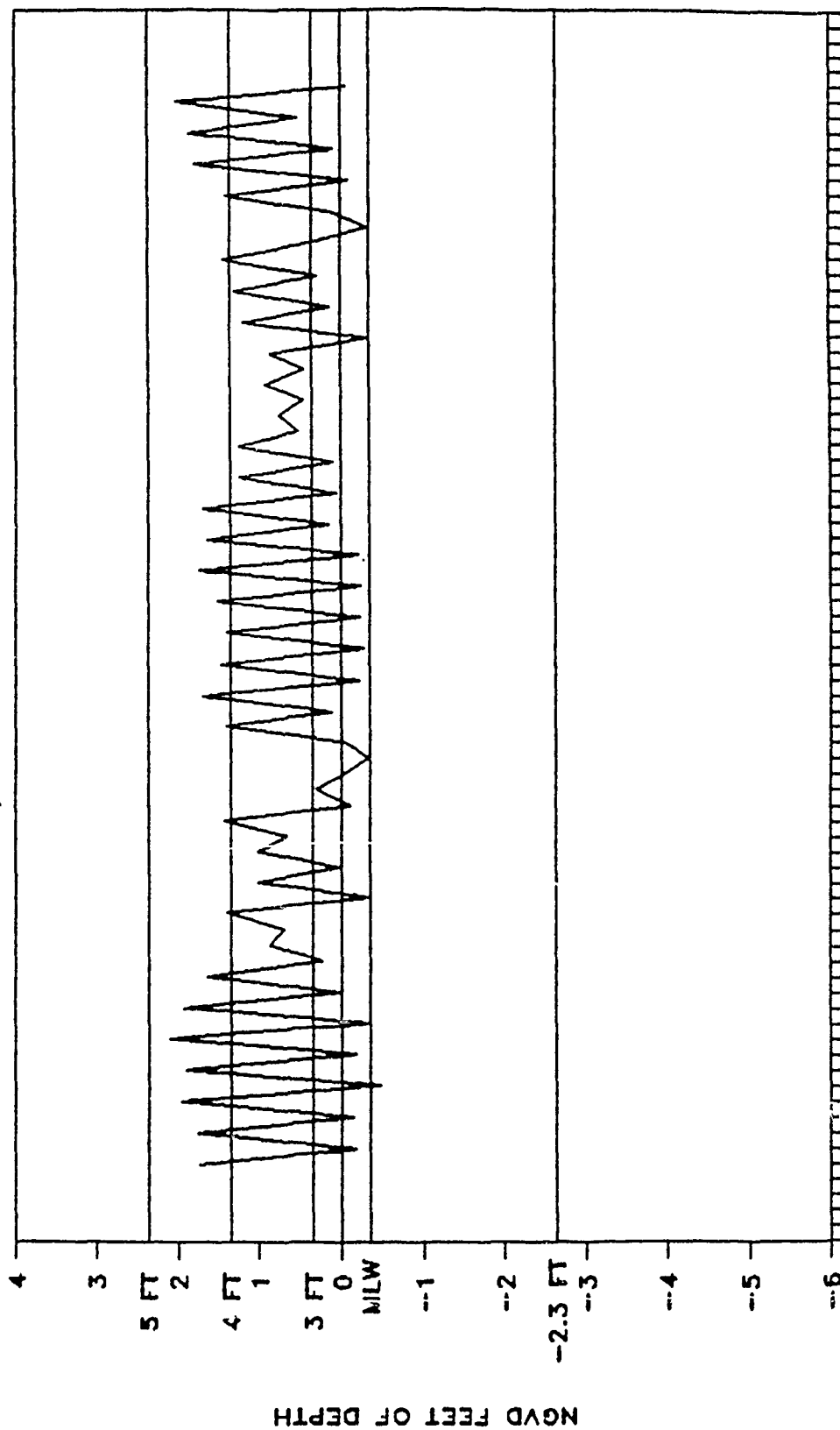


DATE OF TIDE

FIGURE 9

WEEKS BAY TIDES: SEPT 1987

NGVD = 0.0'; MEAN LOW WATER = -0.34 NGVD



2324252627282930

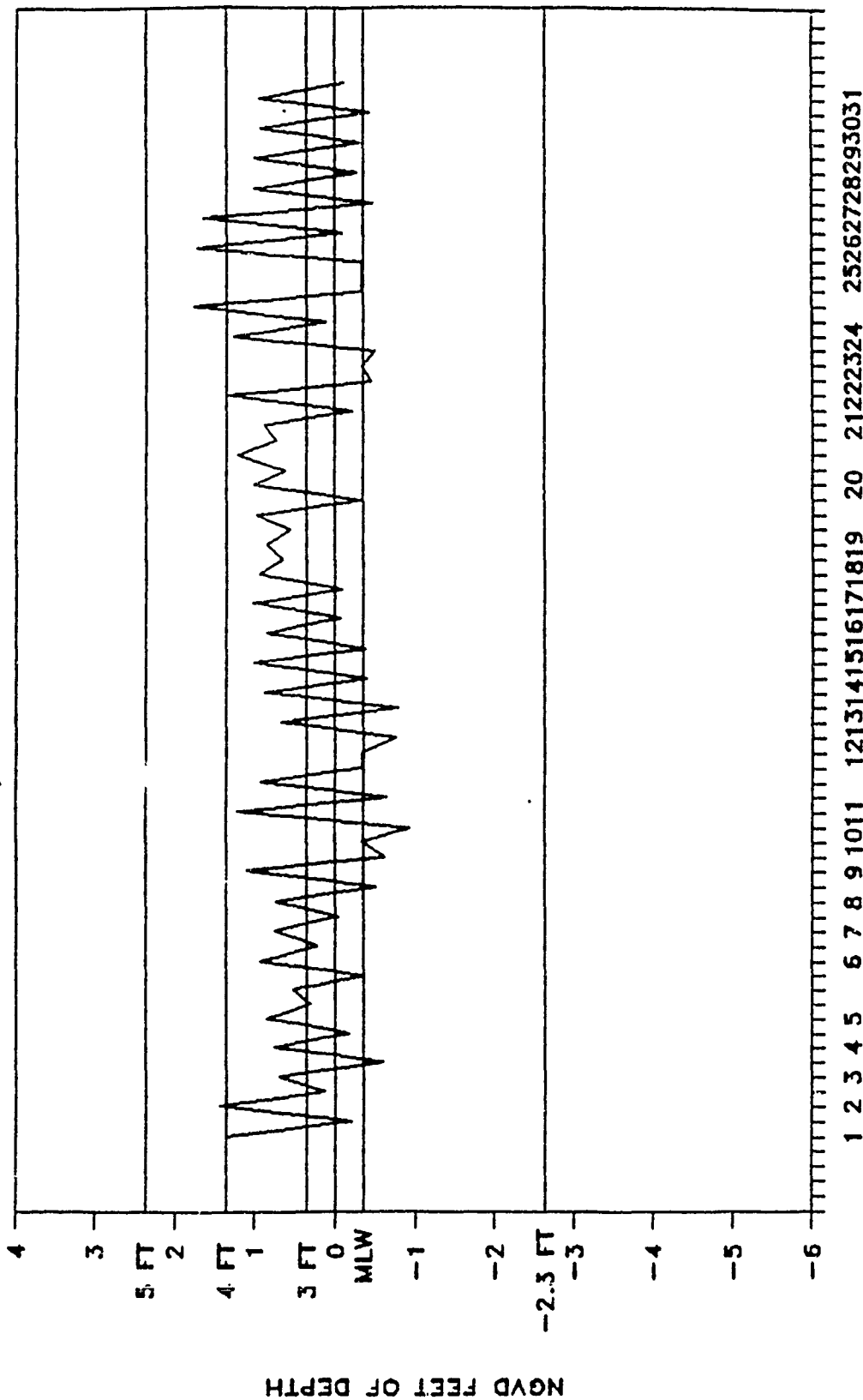
1213141516171819202122

9 1011

DATE OF TIDE

WEEKS BAY TIDES: OCT. 1987

NGVD = 0.0'; MEAN LOW WATER = -0.34 NGVD



DATE OF TIDE

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

WEEKS BAY TIDES: NOV. 1987

NGVD = 0.0'; MEAN LOW WATER = -0.34 NGVD

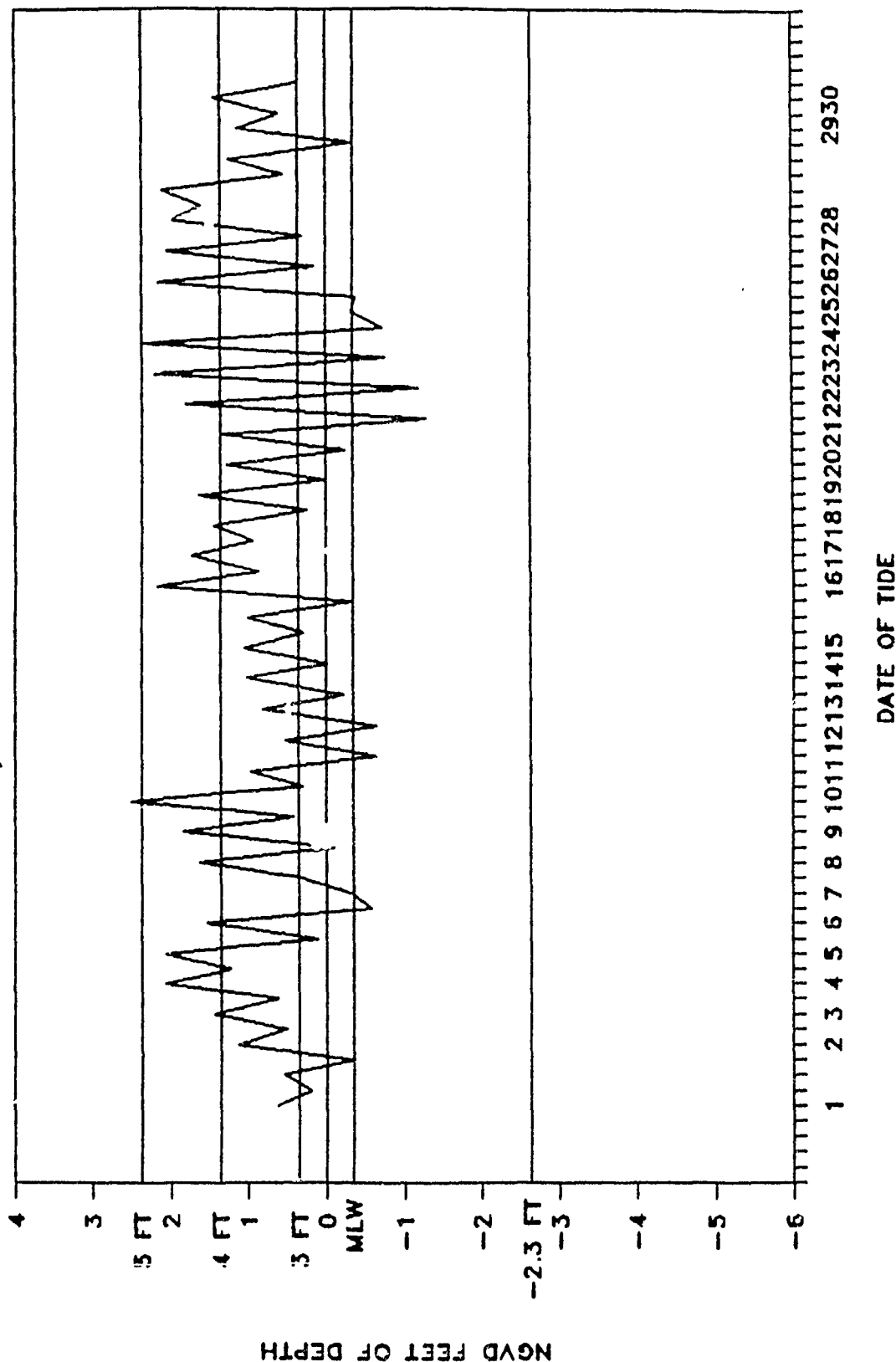
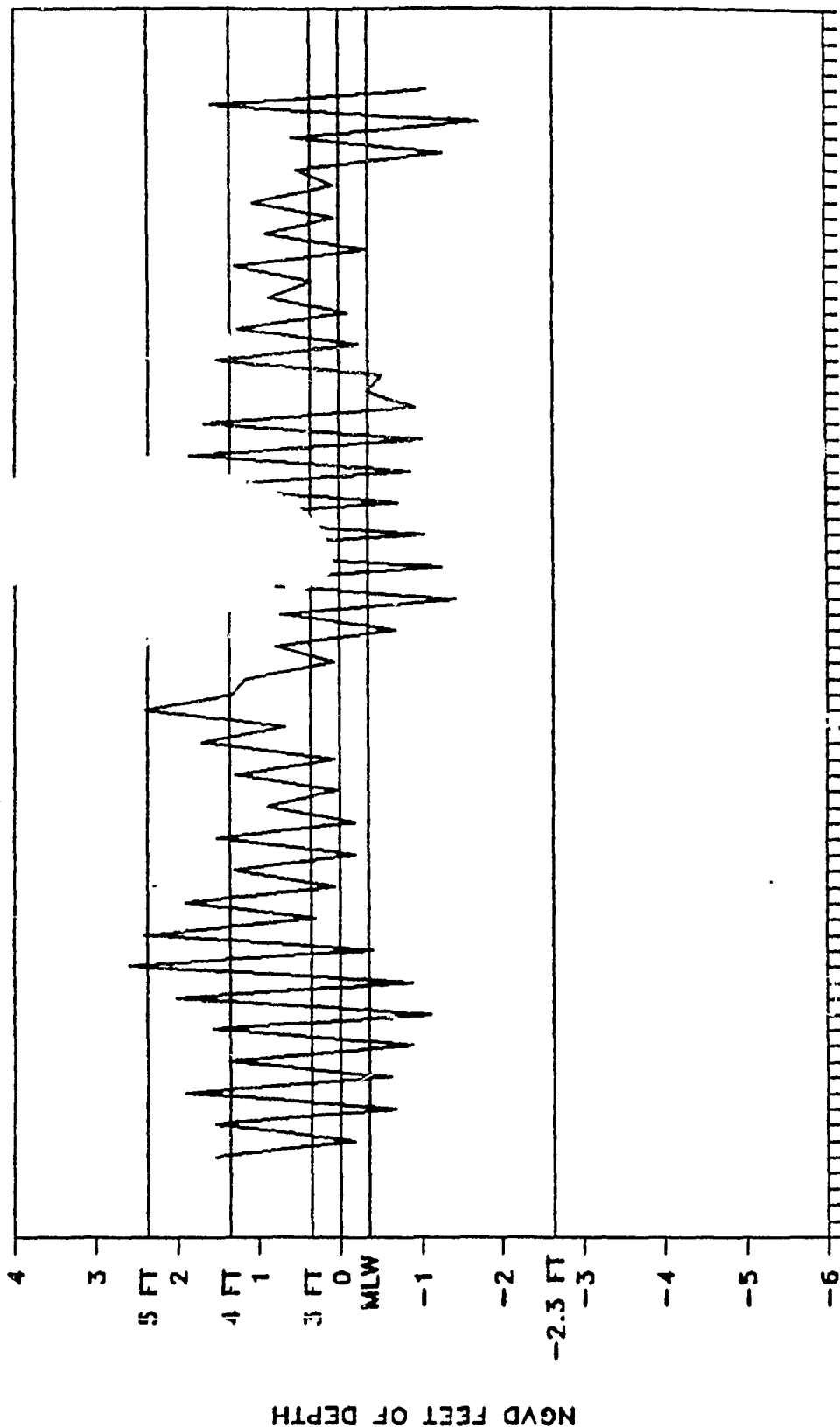


FIGURE 12

WEEKS BAY TIDE DEC. 1987

34 NGVD

NGVD = 0.0'; MEAN LOW WATER



293031

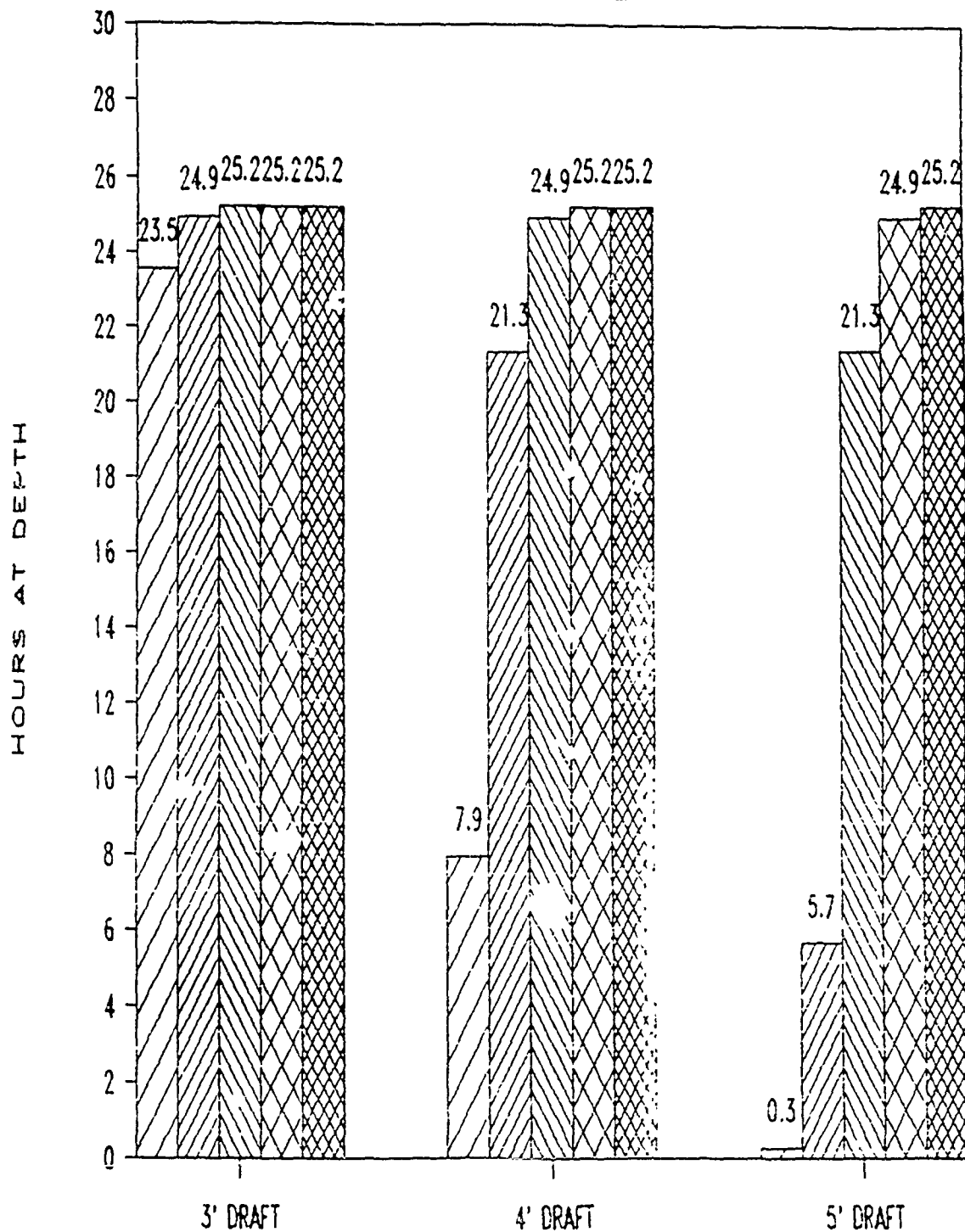
161718192021222324252627 28

9 101112131415

DATE OF TIDE

WEEKS BAY NAVIGABILITY - WITH PROJECT

25.2 HRS=100% NAVIGABILITY



 EXISTING
  3'
  4'
  5'
  6'

APPENDIX C

COMPUTATION OF DREDGING COSTS

WEEKS BAY - SECTION 107 RECON REPORT

PURPOSE

The purpose of this report is to provide dredging estimates for revised alternative channels presently being studied under Section 107. An initial report was provided in March 89, with follow-up revisions made in May 89.

GENERAL

This report studies four alternative channels within the Weeks Bay system, which is made up of Weeks Bay, Fish River and Magnolia River. The four alternatives are as follows:

- 1) channel bottom width of 40 feet, 3 feet in depth
- 2) channel bottom width of 40 feet, 4 feet in depth
- 3) channel bottom width of 45 feet, 5 feet in depth
- 4) channel bottom width of 45 feet, 6 feet in depth

The quantities of material to be removed from the respective channel alternatives have been provided by EN-YD, and are based on intermittent soundings gathered by Corps personnel, rather than on hydrographic surveys of the area. The initial quantities provided by EN-YD include one foot advance maintenance and one foot allowable overdepth.

ASSUMPTIONS

Initial Dredging -

Assume fine-grained material, with the gross yardages 130% of the initial yardages given; bulked yardages are 1.8 times the gross yardages. The distribution of material is not uniform over each reach, based on information provided by EN-YD.

Estimates of cost for dredging are based on the use of a 12" hydraulic dredge, with the placement of material into three upland disposal areas, all located above the 6 meter contour. Disposal areas are assumed to be rectangularly shaped, with an ultimate dike height of 25 feet.

Maintenance Dredging -

Maintenance material is also assumed to be fine-grained, with the gross yardages 150% of the given yardages; bulked yardages are 1.8 times the gross yardage. Maintenance material is assumed to be uniformly distributed over those same channel lengths where initial dredging occurred.

Estimates of dredging costs are based on the same assumptions as the initial dredging, i.e., 12" hydraulic dredge, upland disposal into same three disposal areas, etc. Dredging cycles are computed based on the length of the original shoal and the maintenance quantities per year as provided by EN-YD.

Long-Term Disposal Plan -

It is assumed that the upland disposal areas are sized to enable the sites to contain all the material to be removed over a 50 year project

life. The initial dike height surrounding the sites is assumed to be 10 feet, with an ultimate dike height of 25 feet. It is also assumed that only one interim dike raising will be necessary throughout the project life.

SPREADSHEET

A spreadsheet was developed for the four alternative channel configurations, showing the costs of dredging, both initial and future maintenance, the dredging cycles, and the size of the disposal areas needed for the 50 year project life. It should be noted that the costs do not include E&D, S&I, profit or contingencies.

SUMMARY

Based on the aforementioned assumptions, the estimated costs are provided. Also provided are typical cross-sections of the initial, interim and ultimate dike configurations. It should be noted that the estimating procedure indicates that the initial dredging of the channel reaches, other than Weeks Bay and Fish River at the 3 x 40 ft alternative, appear to be production jobs for the small dredge, while the maintenance of these same reaches becomes a "walking" job, that is, the cost of the job is dependent on how fast the dredge can move through the shoaled area, rather than the amount of material to be removed.

Not included in the costs is the cost of diking for the disposal areas, although the amount of material per foot of dike is shown for the dike cross-sections.

WEEKS BAY - SECTION 107 RECON REPORT

PROJECT DESCRIPTION	INITIAL DREDGING QUANTITIES - CY	GROSS YARDAGE	BULKED YARDAGE	SHOAL LENGTH-LF	MAINT. QUANTITIES CY/YR (NET)	DREDGING CYCLE-YRS	PROJECT LIFE-50 YRS NET YARDAGE
3FT X 40FT							
WEEKS BAY	15,469	20,100	36,200	3,650	1,423	4	86,600
FISH RIVER	20,119	26,200	47,200	5,450	2,125	4	126,400
MAGNOLIA RIVER	12,680	16,500	29,700	2,900	1,131	4	69,200
TOTAL	48,268	62,800	113,100		4,679		282,200
4FT X 40FT							
WEEKS BAY	27,935	36,300	65,300	3,650	1,971	3	126,500
FISH RIVER	33,508	43,600	78,500	5,450	2,943	3	180,700
MAGNOLIA RIVER	21,471	27,900	50,200	2,900	1,566	3	99,800
TOTAL	82,914	107,800	194,000		6,480		407,000
5FT X 45FT							
WEEKS BAY	54,368	70,700	127,300	4,700	3,807	2	244,700
FISH RIVER	54,507	70,900	127,600	6,107	4,947	2	301,900
MAGNOLIA RIVER	35,460	46,100	83,000	3,600	2,916	2	181,300
TOTAL	144,335	187,700	337,900		11,670		727,900
6FT X 45FT							
WEEKS BAY	87,647	113,900	205,000	13,000	13,520	2	763,600
FISH RIVER	73,596	95,700	172,300	6,800	7,072	2	427,200
MAGNOLIA RIVER	47,286	61,500	110,700	4,150	4,316	2	263,100
TOTAL	208,529	271,100	488,000		24,908		1,453,900

WEEKS BAY - SECTION 107 RECON REPORT

PROJECT DESCRIPTION	INITIAL DREDGING COST (\$)	W/P	MOB/DEMOB COST (\$)	TOTAL INIT. COST (\$)	MAINT. COST PER CYCLE (\$)	W/P	MOB/DEMOB COST/CYCLE (\$)	TOTAL COST/CYCLE (\$)
3FT X 40FT								
WEEKS BAY	\$186,000	1	\$53,000		\$186,000	1		
FISH RIVER	\$244,000	1	\$48,400		\$244,000	1		
MAGNOLIA RIVER	\$132,000	2	\$46,200		\$132,000	1		
TOTAL	\$563,000		\$53,000	\$616,000	\$562,000		\$53,000	\$615,000
4FT X 40FT								
WEEKS BAY	\$312,000	2	\$53,000		\$186,000	1		
FISH RIVER	\$338,000	2	\$48,400		\$244,000	1		
MAGNOLIA RIVER	\$213,000	2	\$46,200		\$132,000	1		
TOTAL	\$863,000		\$53,000	\$916,000	\$562,000		\$53,000	\$615,000
5FT X 45FT								
WEEKS BAY	\$508,000	2	\$53,000		\$233,000	1		
FISH RIVER	\$538,000	2	\$48,400		\$271,000	1		
MAGNOLIA RIVER	\$340,000	2	\$46,200		\$160,000	1		
TOTAL	\$1,466,000		\$53,000	\$1,519,000	\$664,000		\$53,000	\$717,000
6FT X 45FT								
WEEKS BAY	\$935,000	2	\$53,000		\$610,000	1		
FISH RIVER	\$719,000	2	\$48,400		\$300,000	1		
MAGNOLIA RIVER	\$446,000	2	\$46,200		\$182,000	1		
TOTAL	\$2,102,000		\$53,000	\$2,155,000	\$1,092,000		\$53,000	\$1,145,000

NOTE: COLUMN "W/P" DENOTES "WALKING" OR PRODUCTION JOB. (1) "WALKING" JOB, (2) PRODUCTION JOB
 * TOTAL COST INCLUDES DREDGING COST AND MAXIMUM MOB/DEMOB FOR ENTIRE JOB TO BE PERFORMED
 COSTS DO NOT INCLUDE E&D, S&I, PROFIT, OR CONTINGENCIES

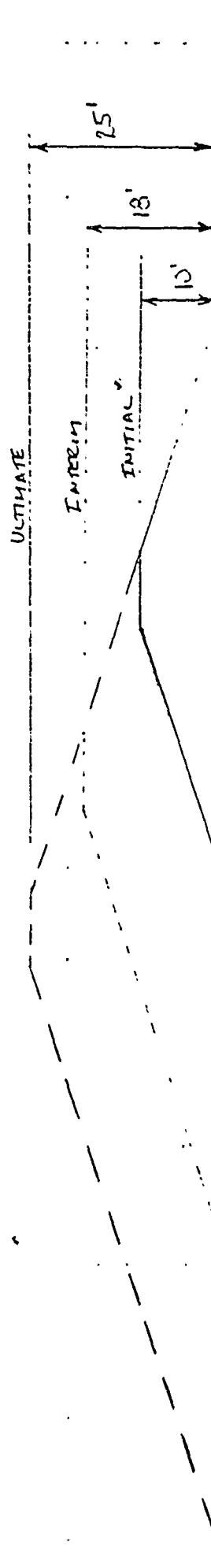
WEEKS BAY - SECTION 107 RECON REPORT

DISPOSAL AREA COMPUTATIONS

PROJECT DESCRIPTION	PROJECT LIFE-50 YRS NET YARDAGE	PROJECT LIFE-50 YRS BULKED YDGE	D/A INTERIOR ACREAGE REQ'D	DIKE LENGTH (LF)	D/A TOTAL ACREAGE REQ'D
3FT X 40FT					
WEEKS BAY	86,600	233,800	5.8	2133	13.6
FISH RIVER	126,400	341,300	8.5	2582	18
MAGNOLIA RIVER	69,200	186,800	4.6	1899	11.6
TOTAL	282,200	761,900	18.9		
4FT X 40FT					
WEEKS BAY	126,500	341,600	8.5	2582	18
FISH RIVER	180,700	487,900	12.1	3080	23.4
MAGNOLIA RIVER	99,800	269,500	6.7	2292	15.1
TOTAL	407,000	1,098,900	27.2		
5FT X 45FT					
WEEKS BAY	241,700	660,700	16.4	3586	29.6
FISH RIVER	301,900	815,100	20.2	3980	34.8
MAGNOLIA RIVER	181,300	489,500	12.1	3080	23.4
TOTAL	722,900	1,965,300	48.7		
6FT X 45FT					
WEEKS BAY	763,600	2,061,700	51.1	6330	74.4
FISH RIVER	427,200	1,153,400	28.6	4735	46
MAGNOLIA RIVER	263,100	710,400	17.6	3715	31.2
TOTAL	1,453,900	3,925,500	97.3		

WEEKS BAY - TYPICAL DIKE CROSS SECTION CONFIGURATIONS

MAY 1990



INITIAL DIKE @ 10'	REQUIRES	14.8 cy / LF
INTERIM DIKE @ 18'	REQUIRES	ADDITIONAL 27.9 cy / LF.
ULTIMATE DIKE @ 25'	REQUIRES	ADDITIONAL 36.0 cy / LF

SUPPLEMENTAL INFORMATION ON DREDGING COSTS

Land Costs for Disposal Areas. The land costs for the disposal areas were based on real estate appraisals prepared in November 1987 with escalation to current prices. Based on the land appraised, a land value of \$3,700 per acre was established for this study. Land costs for each alternative in the main report were computed by taking the total disposal area acreage given on page 5 of this appendix plus the acreage contained in a 10 foot buffer strip around each disposal area and multiplying by the cost of \$3,700 per acre. Land costs for disposal areas are shown in the main report in Table 8 for the Magnolia River reach and in Table 13 for the Fish River - Weeks Bay reach.

Disposal Area Dike Costs. Dike costs for disposal areas were computed based on a cost estimate of \$2.50 per cubic yard for dike construction. Dike quantities were computed by multiplying the linear feet of dike required by the total number of cubic yards required per linear foot for the initial, interim and final dikes. The costs for the dikes in the Magnolia River reach are shown in the main report in Table 8 for the initial dike and in Tables 10 and 11 for the interim and ultimate dikes. The costs for the dikes in the Fish River - Weeks Bay reach are shown in the main report in Table 13 for the initial dike and in Tables 15 and 16 for the interim and ultimate dikes.

Clearing and Grubbing Costs. Clearing and grubbing costs were computed using a unit price of \$1600 per acre and using the disposal area acreage given in page 5 of this appendix plus the acreage required for a 10 foot buffer strip around each disposal area. Clearing and grubbing costs for the Magnolia River reach are shown in Table 8 of the main report and for the Fish River - Weeks Bay reach in Table 13 of the main report.